

VISHAY INTERTECHNOLOGY, INC.



Precision STRAIN GAGES Vishay Micro-Measurements

General Purpose Special Purpose Weldable Temperature Sensors Residual Stress

www.vishaymg.com CATALOG 500



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Important Notice

Vishay Micro-Measurements



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Warning Regarding Life Support Applications

Not all products listed in this catalog are generally recommended for use in life support systems where a failure or malfunction of the component may directly threaten life or cause injury.

The user of products in such applications assumes all risks of such use and will agree to hold Vishay Intertechnology, Inc. and all the companies whose products are represented in this catalog, harmless against all damages.



Precision Strain Gages

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General Information

Vishay Micro-Measurements



USING YOUR CATALOG

The strain gage designation system, gage series selection chart, and selection criteria should be read carefully before ordering or specifying gage types.

The General-Purpose Listings include actual size reproductions of each strain gage pattern, with enlargements of some miniature patterns for gage geometry definition. The listing sequence by gage type is in order of increasing gage length. Gage dimensions are provided in both U.S. Customary (English) and SI units.

GAGE PAT ES = Each section S = Section (S1	TERN Actu Enlation CP = = Sec 1) M =	al size shown arged when n Complete pa Matrix	n. ecessary for definiti attern inch millimet	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062AP		'n	'n	Widely used general- patterns. EK-Series ga when optional feature V	purpose gage. See ges are supplied wi N or SE is not specif	e also 062AQ and 062UW th duplex copper pads (DP) ied.
:	₩ ×	2X	LI.	EA-XX-062AP-120	120 ± 0.15%	W, E, L, LE, P
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALI WIDTH	EK-XX-062AP-350 WA-XX-062AP-120	350 ± 0.15% 120 ± 0.3%	W, SE W*
0.062	0.114	0.062	0.062	WK-XX-062AP-350 EP-08-062AP-120	350 ± 0.3% 120 ± 0.15%	W*
1.57	2.90	1.57	1.57	SA-XX-062AP-120 SK-XX-062AP-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.8\%$	
MATRIX SIZE	0.26L x 0	.16W	6.6L x 4.1W	WD-DY-062AP-350	350 ± 0.8%	

*Options available but not normally recommended. See Optional Features datasheet for details.

A listing of the gage series available for each pattern is shown in the column next to the illustration. Specifications, descriptions and available options are also included for each gage type.

TRANSDUCER-CLASS® GAGES

Customers whose application requires gages for the manufacture of commercial transducers are strongly encouraged to contact our Transducer Applications Department and request the literature and listings of our Transducer-Class strain gages. This literature includes a selection of gages specifically designed for higher volume applications.



CUSTOM GAGES

Vishay Micro-Measurements maintains the most extensive variety of catalog strain gages available today. Whether for stress analysis, transducer manufacturing, or special-purpose applications, we have not only a wide selection, but also a large and varied inventory that is readily available for immediate delivery.

However, many of our customers have applications requiring gages that are manufactured to their individual specifications. While we believe our wide variety of standard catalog gages will satisfy most requirements, we recognize the need for custom products and are committed to serving it well.

To request a quotation for a custom gage, please contact our Applications Engineering Department.





APPLICATIONS SUPPORT

Vishay Micro-Measurements maintains an experienced and highly trained applications engineering staff. Our Applications Engineers are as close as your telephone, and we urge you to call them for recommendations in strain gage selection to satisfy your particular test requirements.

TECHNICAL INFORMATION PROGRAMS

Detailed technical information about the selection and application of strain gages can be found in the special series of Tech Notes, Tech Tips, and Instruction Bulletins on strain gage technology. Thorough familiarity with these publications will help ensure consistent success in the use of Vishay Micro-Measurements strain gages.

We also offer our customers an extensive assortment of additional product and technical literature. To register for our direct mail program, please contact our sales office nearest you. For customers with Internet access, our product and technical literature is also available in the Interactive Guide to Strain Measurement Technology on our Web site at:

http://www.vishaymg.com.

STRAIN GAGE ACCESSORIES AND INSTRUMENTATION

In addition to an extensive selection of strain gages, Vishay Micro-Measurements offers a complete range of complementary products. M-LINE strain gage accessories include surface preparation materials, adhesives, installation tools, protective coatings, leadwire, and a host of other application tools, hardware, and supplies. Instruments range from portable, digital strain indicators, to sophisticated computer-controlled systems for the acquisition, storage, and reduction of test data. Both static and dynamic measuring instruments are available — each uniquely designed to provide stable, accurate, and reliable strain measurement.

TRAINING PROGRAMS

Training customers in the proper use of strain measurement techniques is an essential part of the Vishay Micro-Measurements philosophy. In support of this principle, Vishay Micro-Measurements conducts an extensive series of regularly scheduled technical seminars, workshops, and short courses. Course instructors are recognized authorities in their field. Training sessions are conducted at our facilities in the United States and Europe, as well as at hotels and educational institutions around the world.







Designation System

Vishay Micro-Measurements



Stress Analysis Gages

The Strain Gage Designation System described below applies to Vishay Micro-Measurements General-Purpose Strain Gages.





Standard Strain Gage Series Selection Chart

GAGE			STRAIN	FATIGUE LIFE	
SERIES	DESCRIPTION AND PRIMARY APPLICATION	TEMPERATURE RANGE	RANGE	Strain level in με	Number of Cycles
EA	Constantan foil in combination with a tough, flexible, polyimide backing. Wide range of options available. Primarily intended for general-purpose static and dynamic stress analysis. Not recommended for highest accuracy transducers.	Normal: -100° to +350°F [-75° to +175°C] Special or Short-Term: -320° to +400°F [-195° to +205°C]	±3% for gage lengths under 1/8 in [3.2 mm] ±5% for 1/8 in and over	±1800 ±1500 ±1200	10 ⁵ 10 ⁶ 10 ⁸
CEA	Universal general-purpose strain gages. Constantan grid completely encapsulated in polyimide, with large, rugged copper-coated tabs. Primarily used for general-purpose static and dynamic stress analysis. 'C'-Feature gages are specially highlighted throughout the gage listings.	Normal: -100° to +350°F [-75° to +175°C] Stacked rosettes limited to +150°F [+65°C]	±3% for gage lengths under 1/8 in [3.2 mm] ±5% for 1/8 in and over	±1500 ±1500 *Fatigue life using low sole	10 ⁵ 10 ^{6*} e improved -modulus der.
N2A	Open-faced constantan foil gages with a thin, laminated, polyimide-film backing. Primarily recommended for use in precision transducers, the N2A Series is characterized by low and repeatable creep performance. Also recom- mended for stress analysis applications employing large gage patterns, where the especially flat matrix eases gage installation.	Normal Static Transducer Service: –100° to +200°F [–75° to +95°C]	±3%	±1700 ±1500	10 ⁶ 10 ⁷
WA	Fully encapsulated constantan gages with high- endurance leadwires. Useful over wider temperature ranges and in more extreme environments than EA Series. Option W available on some patterns, but restricts fatigue life to some extent.	Normal: -100° to +400°F [-75° to +205°C] Special or Short-Term: -320° to +500°F [-195° to +260°C]	±2%	±2000 ±1800 ±1500	10 ⁵ 10 ⁶ 10 ⁷
SA	Fully encapsulated constantan gages with solder dots. Same matrix as WA Series. Same uses as WA Series but derated somewhat in maximum temperature and operating environment because of solder dots.	Normal: –100° to +400°F [-75° to +205°C] Special or Short-Term: –320° to +450°F [-195° to +230°C]	±2%	±1800 ±1500	10 ⁶ 10 ⁷
EP	Specially annealed constantan foil with tough, high-elon- gation polyimide backing. Used primarily for measure- ments of large post-yield strains. Available with Options E, L, and LE (may restrict elongation capability).	−100° to +400°F [−75° to +205°C]	±10% for gage lengths under 1/8 in [3.2 mm] ±20% for 1/8 in and over	±1000 EP gages shift under stra	10 ⁴ show zero high-cyclic ins.
ED	Isoelastic foil in combination with tough, flexible polyimide film. High gage factor and extended fatigue life excellent for dynamic measurements. Not normally used in static measurements due to very high thermal-output characteristics.	Dynamic: -320° to +400°F [-195° to +205°C]	±2% Nonlinear at strain levels over ±0.5%	±2500 ±2200	10 ⁶ 10 ⁷
WD	Fully encapsulated isoelastic gages with high-endur- ance leadwires. Used in wide-range dynamic strain measurement applications in severe environments.	Dynamic: -320° to +500°F [-195° to +260°C]	±1.5% — Non- linear at strain levels over ±0.5%	±3000 ±2500 ±2200	10 ⁵ 10 ⁷ 10 ⁸
SD	Equivalent to WD Series, but with solder dots instead of leadwires.	Dynamic: –320° to +400°F[–195° to +205°C]	±1.5% See above note	±2500 ±2200	10 ⁶ 10 ⁷
EK	K-alloy foil in combination with a tough, flexible polyimide backing. Primarily used where a combina- tion of higher grid resistances, stability at elevated temperature, and greatest backing flexibility are re- quired. Supplied with Option DP.	Normal: -320° to +350°F [-195° to +175°C] Special or Short-Term: -452° to +400°F [-269° to +205°C]	±1.5%	±1800	10 ⁷
wк	Fully encapsulated K-alloy gages with high-endurance leadwires. Widest temperature range and most extreme environmental capability of any general-purpose gage when self-temperature compensation is required. Option W available on some patterns, but restricts both fatigue life and maximum operating temperature.	Normal: -452° to +550°F [-269° to +290°C] Special or Short-Term: -452° to +750°F [-269° to +400°C]	±1.5%	±2200 ±2000	10 ⁶ 10 ⁷
sк	Fully encapsulated K-alloy gages with solder dots. Same uses as WK Series, but derated in maximum temperature and operating environment because of solder dots.	Normal: -452° to +450°F [-269° to +230°C] Special or Short-Term: -452° to +500°F [-269° to +260°C]	±1.5%	±2200 ±2000	10 ⁶ 10 ⁷
S2K	K-alloy foil laminated to 0.001 in (0.025 mm) thick, high-performance polyimide backing, with a lami- nated polyimide overlay fully encapsulating the grid and solder tabs. Provided with large solder pads for ease of leadwire attachment.	Normal: -100° to +250°F [-75° to +120°C] Special or Short-Term: -300° to +300°F [-185° to +150°C]	±1.5%	±1800 ±1500	10 ⁶ 10 ⁷

The performance data given here are nominal, and apply primarily to gages of 0.125-in [3-mm] gage length or larger. Refer to Gage Series/Optional Feature data sheet for more detailed description and performance specifications.



Stress Analysis Gages

GAGE SELECTION

Many factors, such as test duration, strain range required, and operating temperature, must be considered in selecting the best strain gage/adhesive combination for a given test profile. These factors and others are addressed in Tech Note TN-505, "Strain Gage Selection — Criteria, Procedures, Recommendations."

SELF-TEMPERATURE COMPENSATION (S-T-C)

All gages with XX as the second code group in the gage designation are self-temperature-compensated for use on struc-

S-T-C NO.		NSION CIENTS**	COMMON MATERIAL				
NO.	per °F	per°C					
	0.8	1.4	Invar, Fe-Ni alloy				
00	0.3	0.5	Quartz, fused				
	0.0	0.0	Titanium Silicate*, polycrystalline				
	3.0	5.4	Alumina, fired				
03	2.7	4.9	Molybdenum [*] , pure				
	2.4	4.3	Ziroopium puro				
	5.1	0.0	Class Cada Lima Cilias				
05	5.1	9.2 a a	Stainless Steel Ferritic (410)				
05	4.8	8.6	Titanium pure				
	4.9	8.8	Titanium Alloy, 6 A1-4V*				
	6.4	11.5	Beryllium, pure				
	6.0	10.8	Cast Iron, gray				
	7.0	12.6	Inconel, Ni-Cr-Fe alloy				
	6.7	12.1	Inconel X, Ni-Cr-Fe alloy				
	7.5	13.5	Monel, Ni-Cu alloy				
	6.6	11.9	Nickel-A, Cu-Zn-Ni alloy				
06	6.3 6.7	10.1	Steel alloy, 4340 Steel Carbon 1008, 1018*				
	6.0	10.8	Steel, Carbon, 1006, 1016				
	0.0	10.0	Age Hardenable (17-4PH)				
	5.7	10.3	Steel Stainless				
	••••		Age Hardenable (17-7PH)				
	5.0	9.0	Steel, Stainless,				
			Age Hardenable (PH15-7Mo)				
	9.3	16.7	Beryllium Copper, Cu 75, Be 25				
	10.2	18.4	Bronze, Phosphor, Cu 90, Sn 10				
09	9.2	16.5	Copper, pure				
	9.0	1/.3	Steel, Stainless, Austeniitic (304)				
	8.0	16.0	Steel Stainless Austenitic (316)				
	0.0	10.0					
	12.9	23.2	Aluminum Alloy, 2024-T4*, 7075-T6				
13	11.1	20.0	Brass, Cartridge, Cu 70, Zn 30				
	13.0	23.4	lin, pure				
15	14.5	26.1	Magnesium Alloy*, AZ-31B				
* Indicates type of material used in determining thermal output							

curves supplied with Micro-Measurements strain gages. **Nominal values at or near room temperature for temperature coefficient of expansion values.

For higher self-temperature-compensations, refer to High S-T-C Gages data sheet.

tural materials with specific thermal expansion coefficients. The table below lists S-T-C numbers and test specimen materials to which gages are thermally matched. A graph of the thermal output curve for the particular alloy lot is included on the engineering data sheet provided with the gages.

When ordering, replace the XX code group with the desired S-T-C number, which is the approximate thermal expansion coefficient of the structural material in ppm/°F. The Gage Designation System lists the available S-T-C numbers for specific grid alloys. The 06 and 13 values, available in A and K alloys, are most common and more likely to be in stock. When not otherwise specified, the 06 compensation is shipped.

GAGE RESISTANCE

Vishay Micro-Measurements strain gages are available in various resistance values that range from 30 to 5000 ohms.

Strain gages with resistances of 120 and 350 ohms are commonly used in experimental stress analysis testing. For the majority of applications, 120-ohm gages are usually suitable; 350-ohm gages would be preferred to reduce heat generation (for the same applied voltage across the gage), to decrease leadwire effects, or to improve signal-to-noise ratios in the gage circuit. Higher resistance gages are typically used in transducer applications and on composite materials.

GAGE FACTOR

Gage Factor (GF) is the measure of sensitivity, or *output*, produced by a resistance strain gage. Gage factor is determined through calibration of the specific gage type, and is the ratio between $\Delta R/R_O$ and $\Delta L/L$ (strain), where R_O is the initial unstrained resistance of the gage. It is affected somewhat by pattern size, geometry, S-T-C number, and temperature. Each gage package is supplied with the GF, as well as its tolerance and temperature sensitivity. Nominal gage factors for various alloys are: A = 2.05; K = 2.1; D = 3.2; P = 2.00.

TRANSVERSE SENSITIVITY

All gages are sensitive, to some degree, to strains transverse to the grid direction. The transverse sensitivity factor (K_t) is given on the engineering data sheet supplied with all gage types for which the data are relevant.

STRAIN GAGE ADHESIVE SELECTION

When selecting a strain gage, it is most important to consider the adhesive that will be used to bond the gage, since the adhesive becomes part of the gage system and correspondingly affects the performance of the gage. However, when the interaction of test characteristics becomes too complex for selecting the gage/adhesive combination in a straightforward manner, contact our Applications Engineering Department for recommendations.

Stress Analysis Gages

CUSTOM GAGES

Unusual applications occasionally require a strain gage which is neither listed in the catalog nor available by adding special optional features. Often a custom product can be designed to fit such needs.

Careful consideration is given to the backing, foil, S-T-C, gage length, pattern, resistance and resistance tolerance, operating temperature range, test duration, maximum strain, cyclic endurance, leads, encapsulation, and trim so that the custom gage is designed to properly meet the user's needs.

Examples of custom gages include such features as unusual patterns, special trim dimensions, and nonstandard lead materials or length.

A special part number is normally assigned to each custom gage. Doing so ensures that the correct gage is produced each time it is ordered. A set-up charge and minimum order will normally apply. For further information contact our Applications Engineering Department.

SUPER STOCK GAGES AND SENSORS

At our facility in Raleigh, North Carolina, we maintain a stock of the most commonly used gages listed in this catalog, for immediate delivery of up to 50 pieces. This new Super Stock listing is somewhat different from the one in the prior version of this catalog. It has been revised to reflect changes in strain gage usage by our customers, and is subject to future changes from time to time.

RAPID RESPONSE GAGES AND SENSORS

Another group of somewhat less commonly ordered gages and sensors are sometimes -- but not always -- available from stock. These Rapid Response gages, when not in stock, can be produced to order with specially reduced lead times.

A listing of both the current Super Stock and Rapid Response gages and sensors is available on the Vishay Web site at:

http://www.vishay.com/ref/gagestock

Also, a copy can be obtained by contacting our Customer Service Department.

STOCK STATUS

To determine the quantities of all gages and sensors currently available from stock, please contact either our Customer Service Department or our sales representative in your area.

Other Gages & Sensors Unavailable From Stock

If gages other than those on the Super Stock and Rapid

Response lists are ordered and are not available from

stock in the ordered quantity, a minimum order

Gages on the Super Stock and Rapid Response lists, as well as those subject to MOR, are subject to change.

Please contact our Customer Service Department to

determine if an MOR is applicable to your order.

requirement applies.

ORDERING REQUIREMENTS

ORDER MULTIPLES

All gages must be ordered in multiples of the number of pieces per package as shown on the price list. For packages with 5 gages each, for example, the order multiples are 5, 10, 15, etc.

MINIMUM ORDER REQUIREMENTS

Super Stock and Rapid Response Gages & Sensors

If gages on either the Super Stock or Rapid Response list are ordered, a minimum order requirement never applies.

Other Gages & Sensors Available From Stock

If gages other than those on the Super Stock and Rapid Response lists are ordered and are in stock in the ordered quantity, a minimum order requirement never applies.





Strain Gage Dimensions

Vishay Micro-Measurements



Gage Dimensions

Gage length is an important consideration in strain gage selection, and is usually the first parameter to be defined.

Dimensions listed for gage length (as measured inside the grid endloops) and grid width refer to active grid dimensions. Overall length and width refer to the actual foil pattern, not including alignment marks or backing.

The matrix size represents the approximate dimensions of the backing/matrix of the gage as shipped. Matrix dimensions are nominal, with a usual tolerance of ± 0.015 in [± 0.4 mm]. If the gages are encapsulated, the matrix may be smaller by as much as 0.01 in [0.25 mm]. Most patterns also include trim marks, and, for use in a restricted area, the backing/matrix may be field-trimmed on all sides to within 0.01 in [0.25 mm] of the foil pattern without affecting gage performance.





General Purpose Strain Gage Listings

Patterns

Linear Patterns	.12
Tee Rosettes	.47
Rectangular Rosettes	.60
Delta Rosettes	.67
Shear /Torque Patterns	.72
SR-4 [®] Patterns	.82

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

FEATURES

- · Gage patterns designed for measuring strain in a single direction
- · Single-grid and parallel dual-grid patterns
- Gage lengths from 0.008 in (0.20 mm) to 0.500 in (12.7 mm)

GAGE PATTERN	Actual size shown. Enlarged when necessary	for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section C S = Section (S1= Sec 1) M	EP = Complete pattern M = Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE

008CL			-		Micro-grid gage for stra	in measurement in I	high-gradient areas.
1	ñ ×	6X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	1	OVERALL WIDTH			
0.008	0.080	0.010		0.068	-		
0.20	2.03	0.25		1.73			
MATRIX SIZE	0.20L x 0	.13W	5.	1L x 3.3W	SA-XX-008CL-120	120 ± 1.0%	

015CK					Micro-miniature pattern pattern.	with enlarged sold	er tabs. See also 015UW
a 1)	₩ ×	6X					
GAGE LENGTH	OVERALL LENGTH	GRIE WIDT) H	OVERALL WIDTH			
0.015	0.065	0.020		0.064		100 + 0.0%	
0.38	1.65	0.51		1.63	EA-XX-015CK-120 WA-XX-015CK-120 EP-08-015CK-120	$120 \pm 0.3\%$ $120 \pm 0.5\%$ $120 \pm 0.3\%$	W, E, L, LE W*
MATRIX SIZE	0.19L x 0	.15W	4.8L>	(3.8W	SA-XX-015CK-120	120 ± 0.5%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu Enla	al size shown. Arged when nece	essary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectionCP = Complete patterninchS = Section (S1= Sec 1)M = Matrixmillimeter				Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
015DJ				Micro-miniature pattern pattern.	with tab at each end	d of grid. See also 015EH
	£	P				
1>	K	4X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.015	0.100	0.020	0.020			
0.38	2.54	0.51	0.51	EA-XX-015DJ-120 EP-08-015DJ-120 SA-XX-015D J-120	$120 \pm 0.3\%$ $120 \pm 0.3\%$ $120 \pm 0.6\%$	L, LE
MATRIX SIZE	0.23L x 0.12W 5.8L x 3.0W			SK-XX-015DJ-120	$120 \pm 0.6\%$	
015DV			,	Micro-miniature pattern pattern.	with higher power c	lissipation than 015EH
		-	-			
3			•			
1.	Х	6X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.015	0.080	0.050	0.050			
0.38	2.03	1.27	1.27	EA-XX-015DV-120	120 ± 0.3%	L, LE
MATRIX SIZE	0.17L x 0	.14W	4.3L x 3.6W	SA-XX-015DV-120	120 ± 0.6%	

015EH					Similar to 015DJ pattern but with tab at each side of grid.		
ب 1)	ί α (-					
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.015	0.025	0.020		0.100			
0.38	0.64	0.51		2.54	EA-XX-015EH-120 EP-08-015EH-120 SA-XX-015EH-120	$120 \pm 0.3\%$ $120 \pm 0.3\%$ $120 \pm 0.6\%$	L, LE
MATRIX SIZE	0.15L x 0.	19W	3.	8L x 4.8W	SK-XX-015EH-120	120 ± 0.6%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each sectio S = Section (S1)	TERN Actu Enla n CP = = Sec 1) M = I	ual size shov arged when Complete p Matrix	vn. necessar pattern	y for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
015LA		×			Primarily used in small	radii where gage tal	bs must be at one end.
1	ř X	4×	`				
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.015	0.070	0.020		0.020			
0.38	1.78	0.51		0.51	EA-XX-0151 A-120	120 + 0.3%	
MATRIX SIZE	0.18L x 0	.10W	4.	6L x 2.5W	EP-08-015LA-120	$120 \pm 0.3\%$ $120 \pm 0.3\%$	

015SE				Micro-miniature pattern	with tabs on one si	de for use near abutments.
:	÷					
1	Х	6X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.015	0.064	0.020	0.065			
0.38	1.63	0.51	1.65	EA-XX-015SE-120	120 ± 0.3%	W, E, L, LE
MATRIX SIZE	0.16L x 0	.14W	4.1L x 3.6W	SA-XX-015SE-120	$120 \pm 0.3\%$ $120 \pm 0.6\%$	

015UW (C' FEATURE			Micro-miniature pattern (1.5 x 1.0 mm). See als	a. Exposed solder ta so 015CK pattern.	b area is 0.06 x 0.04 in
1	Î X	• • • • • • • • • • • • • • • • • • •				CEA-Series Strain Gages
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			solder tabs and a completely encapsulated grid.
0.015	0.140	0.020	0.105			
0.38	3.56	0.51	2.67			
MATRIX SIZE	0.24L x 0	.18W	6.1L x 4.6W	CEA-XX-015UW-120	120 ± 0.3%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu Enla	al size shown. Arged when necessa	ary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectionCP = Complete patterninchS = Section (S1= Sec 1)M = Matrixmillimeter			Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE	
030LB						
				Miniature gage pattern end.	for small radii where	agge tabs must be at one
1	i					
1.	х	6X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.030	0.094	0.030	0.030			
0.76	2.39	0.76	0.76	EA-XX-030LB-120	120 ± 0.2% 120 ± 0.2%	SE
MATRIX SIZE	0.24L x 0	.15W 6	6.1L x 3.8W	SA-XX-030LB-120	$120 \pm 0.2\%$ $120 \pm 0.4\%$	
031CE		<		General-purpose high- 032UW patterns.	resistance miniature	gage. See also 031CF and
	Щ́г.					
12	х	6X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.031	0.076	0.062	0.062			
0.79	1.93	1.57	1.57	WA-XX-031CE-350 EP-08-031CE-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$ $350 \pm 0.2\%$	VV, C, L, LC, M
MATRIX SIZE	0.23L x 0	.16W 5	5.8L x 4.1W	SA-XX-031CE-350	350 ± 0.4%	

031CF		< <u> </u>		General-purpose minia resistance. See also 03	ture gage. Similar to 32UW pattern.	0 031CE pattern except for
1 1	∎ X	6X		EA-XX-031CE-120	120 + 0.2%	WELLEP
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-031CF-350 WA-XX-031CF-120	$350 \pm 0.4\%$ $120 \pm 0.4\%$	E, L*, LE*
0.031	0.076	0.062	0.062	WK-XX-031CF-350 EP-08-031CF-120	$350 \pm 0.4\%$ 120 ± 0.2%	
0.79	1.93	1.57	1.57	SA-XX-031CF-120 SK-XX-031CF-120 SK-XX-031CF-350	$120 \pm 0.4\%$ 120 ± 0.4% 350 ± 0.4%	
MATRIX SIZE	0.19L x 0	.14W 4	4.8L x 3.5W	SD-DY-031CF-350	$350 \pm 0.4\%$	



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	ial size shown. Irged when necess	ary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	on CP = = Sec 1) M =	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
031DE				General-purpose minia	ture gage. See also	031EC pattern.
1)	¢ ×	4X		EA-XX-031DE-120 EA-XX-031DE-350 ED-DY-031DE-350 WA-XX-031DE-120	$\begin{array}{c} 120 \pm 0.2\% \\ 350 \pm 0.2\% \\ 350 \pm 0.4\% \\ 120 \pm 0.4\% \end{array}$	E, SE, L, LE E, SE, L, LE E, L*, LE*
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-031DE-350 WK-XX-031DE-350	$350 \pm 0.4\%$ $350 \pm 0.4\%$	
0.031	0.140	0.032	0.032	EP-08-031DE-120 SA-XX-031DE-120	$120 \pm 0.2\%$ $120 \pm 0.4\%$ $250 \pm 0.4\%$	
0.79	3.56	0.81	0.81	SA-XX-031DE-350 SK-XX-031DE-120 SK-XX-031DE-350	$350 \pm 0.4\%$ 120 ± 0.4% 350 ± 0.4%	
MATRIX SIZE	0.27L x 0	.12W	6.9L x 3.0W	SD-DY-031DE-350	$350 \pm 0.8\%$	
031EC				General-purpose minia tab at each side of gric	ture gage. Similar to I.	0 031DE pattern but with
	tie X	- D		EA-XX-031EC-120 EA-XX-031EC-350 ED-DY-031EC-350	120 ± 0.2% 350 ± 0.2% 350 ± 0.4%	E, SE, L, LE E, SE, L, LE E, L*, LE*
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-031EC-120 WA-XX-031EC-350 WK-XX-031EC-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$ $350 \pm 0.4\%$	
0.031	0.042	0.032	0.140	EP-08-031EC-120 SA-XX-031EC-120	120 ± 0.2% 120 ± 0.4%	
0.79	1.07	0.81	3.56	SA-XX-031EC-350 SK-XX-031EC-120	$350 \pm 0.4\%$ 120 ± 0.4%	
MATRIX SIZE	0.17L x 0	.23W	4.3L x 5.8W	SD-DY-031EC-350	$350 \pm 0.4\%$ $350 \pm 0.8\%$	
032SG				Miniature gage with sic	le-tab geometry.	
ji	t.					
1	Х	6X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.032	0.064	0.032	0.072	EA-XX-032SG-120 WA-XX-032SG-120	$120 \pm 0.2\%$ $120 \pm 0.4\%$ $120 \pm 0.4\%$	W, E, L, LE, P
0.81	1.63	0.81	1.83	EP-08-032SG-120 SA-XX-032SG-120	$120 \pm 0.4\%$ $120 \pm 0.2\%$ $120 \pm 0.4\%$	
MATRIX SIZE	0.16L x	0.19W	4.1L x 4.8W	SK-XX-032SG-120	120 ± 0.4%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each sectio S = Section (S1:	TERN Actu Enla n CP = = Sec 1) M = I	al size show rged when r Complete p Matrix	n. necessar pattern	y for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
032UW		Ì	'C' F	EATURE	General-purpose minia 0.04 in (1.8 x 1.0 mm).	ture gage. Exposed	solder tab area is 0.07 x
	É. X	2X	Á				CEA-Series Strain Gages
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			solder tabs and a completely encapsulated grid.
0.032	0.180	0.060		0.120			Available with Option P2
0.81	4.57	1.52		3.05			
MATRIX SIZE 0.27L x 0.19W 6.9L x 4.8W					CEA-XX-032UW-120	120 ± 0.3%	
04541							

045AL					Miniature high-resistand	ce gage.	
i 1	¥ X	4 X					
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH			
0.045	0.090	0.045		0.045			
1.14	2.29	1.14		1.14	FA-XX-045AL-350	350 + 0 15%	F
MATRIX SIZE	0.22L x 0.	.14W	5.	6L x 3.6W	SA-XX-045AL-350	$350 \pm 0.13\%$	E

050AH				General-purpose miniature gage.			
1:	₩ ×	4X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH				
0.050	0.100	0.040	0.040	EA-XX-050AH-120 ED-DY-050AH-350 EP-08-050AH-120	$120 \pm 0.15\%$ $350 \pm 0.4\%$ $120 \pm 0.15\%$	E, L, LE E, L*, LE*	
1.27	2.54	1.02	1.02	SA-XX-050AH-120 SK-XX-050AH-350	$120 \pm 0.13\%$ $120 \pm 0.3\%$ $350 \pm 0.3\%$		
MATRIX SIZE	0.23L x 0.	14W	5.8L x 3.6W	SD-DY-050AH-350	350 ± 0.8%		



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each sectio S = Section (S1:	TERN Actu Enla n CP = = Sec 1) M = I	al size shown. Irged when necess Complete pattern Matrix	ary for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
050AR		·		General-purpose minia	ature gage with large	e solder tabs.
真 1X		4X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-050AR-120 ED-DY-050AR-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.4\% \end{array}$	W, E, L, LE, P E, L*, LE*
0.050	0.100	0.050	0.078	WA-XX-050AR-120 WK-XX-050AR-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $120 \pm 0.3\%$	W* W*
1.27	2.54	1.27	1.98	SA-XX-050AR-120 SK-XX-050AR-350 SD-DY-050AR-350	$350 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.8\%$	
MATRIX SIZE	0.25L x 0).18W	6.4L x 4.6W	WD-DY-050AR-350	350 ± 0.8%	
050SB				Similar to the 050AH p	pattern but with solde	er tabs at side of grid.
澟	Ú A					
1X		4X			120 0.15%	
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-050SB-350 WA-XX-050SB-120	$120 \pm 0.13\%$ $350 \pm 0.4\%$ $120 \pm 0.3\%$	W, E, L, LE, F E, L*, LE* W*
0.050	0.070	0.040	0.080	WK-XX-050SB-350 EP-08-050SB-120	$350 \pm 0.3\%$ $120 \pm 0.15\%$	W*
1.27	1.78	1.02	2.03	SA-XX-050SB-120 SK-XX-050SB-350 SD-DX-050SB-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.8\%$	
MATRIX SIZE	0.19L x 0).19W	4.8L x 4.8W	WD-DY-050SB-350	$350 \pm 0.8\%$	
060BN		-[]//]]-		General-purpose minia	ature gage.	
1] K	4X				

			•			
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D OVERALL TH WIDTH			
0.060	0.104	0.054	0.054	EA-XX-060BN-120	120 ± 0.15%	E, P
1.52	2.64	1.37	1.37	SA-XX-060BN-350 SK-XX-060BN-120	$350 \pm 0.4\%$ 120 ± 0.3% 350 ± 0.3%	
MATRIX SIZE	0.18L x 0	.13W	4.6L x 3.3W	SD-DY-060BN-350	350 ± 0.8%	



General Purpose Strain Gages - Linear Patterns

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ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete patterr Matrix	n inch millimeter	Insert desired S-T-C number in spaces marked XX.	Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
060CC						
		-		Small high-resistance g also 060CP pattern.	age with high power	r-handling capability. See
1.	х	2X		E4-XX-060CC-350	350 + 0 15%	WELLEP
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-060CC-10C WA-XX-060CC-350	$\begin{array}{c} 330 \pm 0.13\% \\ 1000 \pm 0.4\% \\ 350 \pm 0.3\% \end{array}$	W, L, L, LL, T E, L*, LE* W*
0.060	0.200	0.180	0.180	WK-XX-060CC-10C EP-08-060CC-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.15\% \\ 350 \pm 0.2\% \end{array}$	W*
1.52	5.08	4.57	4.57	SK-XX-060CC-10C SD-DY-060CC-10C	$1000 \pm 0.3\%$ $1000 \pm 0.8\%$	
MATRIX SIZE	0.33L x 0	.27W	8.3L x 6.9W	WD-DY-060CC-10C	1000 ± 0.8%	
060CD				Small high-resistance	gage. See also 0600	CN pattern.
1X		2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-060CD-350 ED-DY-060CD-10C	$350 \pm 0.15\%$ $1000 \pm 0.4\%$	W, E, L, LE, P E, L*, LE*
0.060	0.150	0.100	0.100	WA-XX-060CD-350 WK-XX-060CD-10C	$350 \pm 0.3\%$ 1000 $\pm 0.3\%$ 250 $\pm 0.3\%$	W* W*
1.52	3.81	2.54	2.54	SK-XX-060CD-330 SK-XX-060CD-10C SD-DY-060CD-10C	$1000 \pm 0.3\%$ $1000 \pm 0.8\%$	
MATRIX SIZE	0.28L x 0	.20W	7.1L x 5.1W	WD-DY-060CD-10C	1000 ± 0.8%	
060CN		hunhurá		Similar to 060CD patt	ern except for grid r	esistance.
	1X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-060CN-120 ED-DY-060CN-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.4\% \end{array}$	W, E, L, LE, P E, L*, LE*
0.060	0.150	0.100	0.100	WA-XX-060CN-120 WK-XX-060CN-350	$120 \pm 0.3\% \\ 350 \pm 0.3\% \\ 120 \pm 0.15\%$	W* W*
1.52	3.81	2.54	2.54	SA-XX-060CN-120 SD-DY-060CN-350	$120 \pm 0.15\%$ $120 \pm 0.3\%$ $350 \pm 0.8\%$	
MATRIX SIZE	0.26L x (D.18W	6.6L x 4.6W	WD-DY-060CN-350	350 ± 0.8%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	ial size shown. Irged when necess	ary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
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060CP		- []))))))))))))))))))))))))))))))))))))		Similar to the 060CC p	pattern except for gri	d resistance.
1	Х	2X			120 ± 0.15%	WELLED
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-060CP-120 WA-XX-060CP-120	$120 \pm 0.13\%$ $350 \pm 0.4\%$ $120 \pm 0.3\%$	W, L, L, LL, F E, L*, LE* W*
0.060	0.200	0.180	0.180	WK-XX-060CP-350 EP-08-060CP-120	$350 \pm 0.3\%$ $120 \pm 0.15\%$	W*
1.52	5.08	4.57	4.57	SA-XX-060CP-120 SK-XX-060CP-350 SD-DY-060CP-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.8\%$	
MATRIX SIZE	0.31L x 0	.26W	7.9L x 6.6W	WD-DY-060CP-350	$350 \pm 0.8\%$	
060EK				Small high-resistance of	gage with large grid a	area and side-tab geometry.
-UII 1	iiiin X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.060	0.080	0.150	0.230	EA-XX-060EK-350	350 ± 0.15%	E, L, LE
1.52	2.03	3.81	5.84	ED-DY-060EK-10C SA-XX-060EK-350 SK-XX-060EK-10C	$1000 \pm 0.4\%$ $350 \pm 0.3\%$ $1000 \pm 0.3\%$	E, L", LE"
MATRIX SIZE	0.15L x (0.30W	3.8L x 7.6W	SD-DY-060EK-10C	$1000 \pm 0.8\%$	
060PB		nalim ⁴ ration		Dual pattern for back centerlines spaced 0.0	k-to-back bending s 85 in (2.16 mm) apa	sections. Longitudinal grid rt.
-		-				
1X		2X		EA-XX-060PB-120 EA-XX-060PB-350	120 ± 0.2% 350 ± 0.2%	W, E, L, LE W, E, L, LE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-060PB-120 WA-XX-060PB-350	$\begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	W* W*
0.060 ES	0.120 CP	0.065 ES	0.150 CP	WK-XX-060PB-350 WK-XX-060PB-500	$350 \pm 0.3\%$ $500 \pm 0.3\%$ $120 \pm 0.2\%$	W* W*
1.52 ES	3.05 CP	1.65 ES	3.81 CP	SA-XX-060PB-120 SA-XX-060PB-350 SK-XX-060PB-350	$120 \pm 0.3\%$ 350 ± 0.3% 350 ± 0.3%	



General Purpose Strain Gages - Linear Patterns

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062AA		-	, 1		General-purpose gage for WA, WK, and other	with large solder ta series with this grid	bs. See the 062AP pattern size.
1:	X	2X		OVERALL			
		WIDT	, H	WIDTH			
1.57	3.81	1.57		2.54			
MATRIX SIZE	0.35L x 0	.21W	8.	9L x 5.3W	EA-XX-062AA-120	120 ± 0.15%	E, P

062AK					General-purpose gage pattern for WA, WK, an	e with elongated so d other series with the	older tabs. See the 062AP his grid size.
			- -				
12	X	2X					
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.062	0.160	0.062		0.062			
1.57	4.06	1.57		1.57	EA-XX-062AK-120	120 ± 0.15%	E, P F
MATRIX SIZE	0.27L x 0	.14W	6.	9L x 3.6W	EP-08-062AK-120	$120 \pm 0.15\%$	

062AP		ï			Widely used general- patterns. EK-Series gas when optional feature V	purpose gage. See ges are supplied wi V or SE is not specif	e also 062AQ and 062UW th duplex copper pads (DP) ied.
ैं। 12	∰ X	2>			EA-XX-062AP-120	120 ± 0.15%	W, E, L, LE, P
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH	EK-XX-062AP-350 WA-XX-062AP-120	$350 \pm 0.14\%$ $350 \pm 0.15\%$ $120 \pm 0.3\%$	W, SE W*
0.062	0.114	0.062		0.062	WK-XX-062AP-350 EP-08-062AP-120	$350 \pm 0.3\%$ 120 ± 0.15%	W*
1.57	2.90	1.57		1.57	SA-XX-062AP-120 SK-XX-062AP-350 SD-DY-062AP-350	$120 \pm 0.3\%$ 350 ± 0.3% 350 ± 0.8%	
MATRIX SIZE	0.26L x 0	.16W	6.	6L x 4.1W	WD-DY-062AP-350	$350 \pm 0.8\%$	



General Purpose Strain Gages - Linear Patterns

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ES = Each sectio S = Section (S1	en CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062AQ). Turim (General-purpose gage resistance grid. See als	. Similar to 062AP pa so 062UW pattern.	attern but with high-
3	<u>الم</u>					
1)	×	2X				
GAGE	OVERALL	GRID	OVERALL	EA-XX-062AQ-350 ED-DY-062AQ-500	$350 \pm 0.15\%$ $500 \pm 0.4\%$	W, E, L, LE, P E. L*. LE*
LENGTH	LENGTH	WIDTH	WIDTH	WA-XX-062AQ-350 WK-XX-062AQ-500	$350 \pm 0.3\%$ $500 \pm 0.3\%$	W* W*
0.062	0.114	0.062	0.062	EP-08-062AQ-350	$350 \pm 0.15\%$ $350 \pm 0.3\%$	
1.57	2.90	1.57	1.57	SK-XX-062AQ-500	$500 \pm 0.3\%$ $500 \pm 0.3\%$	
MATRIX SIZE	0.26L x 0).15W	6.6L x 3.8W	WD-DY-062AQ-500	$500 \pm 0.8\%$ 500 ± 0.8%	
062AU		`nńn		Similar to 062AP patte when 120-ohm resistar	ern but with low-res nce is needed in WK	istance grid. Normally used or SK Series.
ini: ini:						
12	X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.062	0.114	0.062	0.062			
1.57	2.90	1.57	1.57			14/#
MATRIX SIZE	0.26L x 0	.16W 6	6.6L x 4.1W	SK-XX-062AU-120	$120 \pm 0.3\%$ 120 ± 0.3%	VV *
062DF		,		General-purpose gage 062DN pattern.	with solder tab at ea	ach end of grid. See also
:						
	1X	2X		EA-XX-062DF-120	120 ± 0.15%	E. L. LE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-062DF-350 WA-XX-062DF-120	350 ± 0.4% 120 ± 0.3%	E, L*, LE*
0.062	0.190	0.062	0.062	WK-XX-062DF-350 EP-08-062DF-120	$\begin{array}{c} 350\ \pm\ 0.3\%\\ 120\ \pm\ 0.15\%\end{array}$	
1.57	4.83	1.57	1.57	SA-XX-062DF-120 SK-XX-062DF-350	$ \begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \\ 050 \pm 0.2\% \end{array} $	
MATRIX SIZE	0.32L x 0	.16W 8	3.1L x 4.1W	WD-DY-062DF-350	$350 \pm 0.8\%$ $350 \pm 0.8\%$	



General Purpose Strain Gages - Linear Patterns

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ES = Each sectio S = Section (S1	n CP = = Sec 1) M =	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062DN		, i		Similar to 062DF patter	n except for grid resi	istance.
1	X	2X			250 ± 0.15%	FIIF
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-062DN-550 ED-DY-062DN-500 WA-XX-062DN-350	$500 \pm 0.13\%$ $500 \pm 0.4\%$ $350 \pm 0.3\%$	E, L*, LE*
0.062	0.190	0.062	0.062	WK-XX-062DN-500 EP-08-062DN-350 SA-XX-062DN-350	$500 \pm 0.3\% \\ 350 \pm 0.15\% \\ 350 \pm 0.3\%$	
1.57	4.83	1.57	1.57	SK-XX-062DN-500 SD-DY-062DN-500	$500 \pm 0.3\% \\ 500 \pm 0.8\% \\ 500 \pm 0.8\%$	
MATRIX SIZE	0.34L x 0	.18W 8	.6L x 4.6W	WD-DY-062DN-500	500 ± 0.8%	
062ED				General-purpose gage at each side of grid. S	. Similar to 062DF p ee also 062EN patte	pattern but with solder tab ern
	Υψ́					
1	Х	2X		EA-XX-062ED-120	120 ± 0.15%	E. L. LE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-062ED-350 WA-XX-062ED-120	$350 \pm 0.4\%$ $120 \pm 0.3\%$	E, L [*] , LE*
0.062	0.076	0.062	0.190	EP-08-062ED-120	$350 \pm 0.3\%$ 120 ± 0.15% 120 ± 0.3%	
1.57	1.93	1.57	4.83	SK-XX-062ED-350 SD-DY-062ED-350	$350 \pm 0.3\%$ $350 \pm 0.8\%$	
MATRIX SIZE	0.21L x 0	.29W 5	.3L x 7.4W	WD-DY-062ED-350	350 ± 0.8%	
062EN				Similar to 062ED patte	rn except for grid re	sistance.
- U UU	(B)	- I				
1)	×	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-062EN-350 ED-DY-062EN-500 WA-XX-062EN-350	$\begin{array}{c} 350 \pm 0.15\% \\ 500 \pm 0.4\% \\ 350 \pm 0.3\% \end{array}$	E, L, LE E, L*, LE*
0.062	0.076	0.062	0.190	WK-XX-062EN-500 EP-08-062EN-350	$\begin{array}{c} 500 \pm 0.3\% \\ 350 \pm 0.15\% \\ 350 \pm 0.2\% \end{array}$	
1.57	1.93	1.57	4.83	SA-XX-062EN-350 SK-XX-062EN-500 SD-DY-062EN-500	$500 \pm 0.3\%$ $500 \pm 0.3\%$ $500 \pm 0.8\%$	
MATRIX SIZE	0.23L x 0	.31W 5	.8L x 7.9W	WD-DY-062EN-500	500 ± 0.8%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu Enla	al size shown. Irged when necess	sary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectionCP = Complete patterninchS = Section (S1= Sec 1)M = Matrixmillimeter				Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062UW	×	°C'	FEATURE	General-purpose gage (1.8 x 1.0 mm).	. Exposed solder tab	CEA-Series Strain Gages feature large copper solder tabs and a completely
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			encapsulated grid. Available with Option P2
0.062	0.220	0.120	0.120			(preattached leadwire cables)
1.57	5.59	3.05	3.05		120 ± 0.2%	
MATRIX SIZE	0.31L x 0).19W	7.9L x 4.8W	CEA-XX-0620W-120 CEA-XX-062UW-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$	
070LC		Very narrow gage for u	se in restricted area	IS.		
1	Х	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.070	0.164	0.022	0.022			
1.78	4.17	0.56	0.56		$120 \pm 0.15\%$	SE
MATRIX SIZE	0.24L x 0	.09W	6.1L x 2.3W	EA-XX-070LC-350	$350 \pm 0.15\%$	SE

075AA		`mîm/		General-purpose gage	with large solder ta	bs. See also 075AM pattern.
1	Ŭ. ↓● ×	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.075	0.180	0.075	0.120			
1.91	4.57	1.91	3.05	EA-XX-07544-120	120 + 0 15%	
MATRIX SIZE	0.31L x 0	.18W	7.9L x 4.6W	ED-DY-075AA-350	$350 \pm 0.3\%$	E E



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu Enla	al size shown. arged when necessa	ary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
075AM		`ATTŮNTI (General-purpose gage except for resistance.	with large solder tab	s. Similar to 075AA pattern
, O,						
1)	ĸ	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.075	0.180	0.075	0.120			
1.91	4.57	1.91	3.05			5.5
MATRIX SIZE	0.31L x 0	.18W	7.9L x 4.6W	ED-DY-075AM-350	$350 \pm 0.15\%$ 1000 ± 0.4%	E, P E
090DG			Intermediate-size grid v 090EF patterns.	with tab at each end.	See also 090DH and	
-						
1>	<	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.090	0.250	0.125	0.125	EA-XX-090DG-120 ED-DY-090DG-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.4\% \\ 420 \pm 0.4\% \end{array}$	E, L, LE E, L*, LE*
2.29	6.35	3.18	3.18	EP-08-090DG-120 SA-XX-090DG-120 SK-XX-090DG-350	$\begin{array}{c} 120 \pm 0.15\% \\ 120 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	
MATRIX SIZE	0.44L x 0	.26W 1	1.2L x 6.6W	SD-DY-090DG-350	350 ± 0.8%	

090DH					High-resistance version of the 090DG pattern.			
	1X	2X	►					
GAGE LENGTH	OVERALL LENGTH	GRID WIDT) H	OVERALL WIDTH				
0.090	0.250	0.125		0.125	EA-XX-090DH-350 ED-DY-090DH-10C	$350 \pm 0.15\%$ $1000 \pm 0.4\%$	E, L, LE E, L*, LE*	
2.29	6.35	3.18		3.18	SA-XX-090DH-350 SK-XX-090DH-350	$350 \pm 0.15\%$ $350 \pm 0.3\%$ $1000 \pm 0.3\%$		
MATRIX SIZE	0.45L x 0	.27W	11	.4L x 6.9W	SD-DY-090DH-10C	1000 ± 0.8%		



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each section S = Section (S1	TERN Actu Enla on CP = = Sec 1) M =	al size shown arged when ne Complete pa Matrix	cessary for definition. ttern inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
090EF		, in the second s	Anna 🗖	Similar to 090DG patte also 090EG pattern.	rn but with solder tal	o at each side of grid. See
	- F	۹ پ	2X			
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.090	0.125	0.125	0.250	EA-XX-090EF-120 ED-DY-090EF-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.4\% \\ 420 \pm 0.4\% \end{array}$	E, L, LE E, L*, LE*
2.29	3.18	3.18	6.35	SA-XX-090EF-120	$120 \pm 0.15\%$ $120 \pm 0.3\%$ $250 \pm 0.2\%$	
MATRIX SIZE	0.29L x 0	.36W	7.4L x 9.1W	SD-DY-090EF-350	$350 \pm 0.3\%$ $350 \pm 0.8\%$	
090EG		× 4	,	High-resistance version	n of the 090EF patte	rn.
	٠È	-				
	1X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.090	0.120	0.125	0.250	EA-XX-090EG-350 ED-DY-090EG-10C	$350 \pm 0.15\%$ $1000 \pm 0.4\%$	E, L, LE E, L*, LE*
2.29	3.05	3.18	6.35	EP-08-090EG-350 SA-XX-090EG-350 SK-XX-090EG-100	$\begin{array}{c c} 350 \pm 0.15\% \\ 350 \pm 0.3\% \\ 1000 \pm 0.3\% \end{array}$	
MATRIX SIZE	0.29L x 0	.36W	7.4L x 9.1W	SD-DY-090EG-10C	$1000 \pm 0.3\%$ $1000 \pm 0.8\%$	
02000						

090SC				Side-tab gage with extr	emely narrow grid fo	or use near abutments.
	B					
1.	x	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	-		
0.090	0.120	0.010	0.060			
2.29	3.05	0.25	1.52	EA-XX-090SC-120	120 ± 0.2% 120 ± 0.4%	W, E, L, LE, P W*
MATRIX SIZE	0.18L x 0	.14W	4.6L x 3.6W	SA-XX-090SC-120	120 ± 0.4%	v v



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each sectio S = Section (S1:	TERN Actu Enla n CP = = Sec 1) M = I	al size shown rged when n Complete pa Matrix	n. ecessar attern	y for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
100BR		, IIÎII,	,		Narrow grid pattern with	I large solder tabs.	
]	•				
	-	l di					
1)	<	2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	4	OVERALL WIDTH	EA-XX-100BR-120 ED-DY-100BR-350	120 ± 0.15% 350 ± 0.4%	W, E, L, LE, P E, L*, LE*
0.100	0.225	0.050		0.100	WA-XX-100BR-120 WK-XX-100BR-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $120 \pm 0.3\%$	W* W*
2.54	5.72	1.27		2.54	SK-XX-100BR-350	$350 \pm 0.3\%$	
MATRIX SIZE	0.34L x 0	.16W	8.	6L x 4.1W	WD-DY-100BR-350	$350 \pm 0.8\%$ $350 \pm 0.8\%$	
100GD			Ultra-high-resistance ga	age with compact ge	ometry.		
		h,i					
1>	<	2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	1	OVERALL WIDTH			
0.100	0.101	0.000		0.000			

0.100	0.181	0.080		0.080			
2.54	4.60	2.03		2.03	SK-XX-100GD-45C	4500 + 0.2%	
MATRIX SIZE	0.24L x 0	.13W	6.1	L x 3.3W	WK-XX-100GD-45C	4500 ± 0.2%	

125AA					General-purpose gage and 125UW patterns.	with large solder tal	bs. See also 125AD, 125UN
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH			
0.125	0.300	0.125		0.200			
3.18	7.62	3.18		5.08	FA-XX-125AA-120	120 + 0 15%	FP
MATRIX SIZE	0.46L x 0	.26W	11.7	7L x 6.6W	ED-DY-125AA-350	350 ± 0.3%	E .

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	ial size shown. Irged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125AC		•• ` ¶		Widely used general-pu 125AD, 125UN, and 1 with duplex copper pa specified.	urpose gage with hig 25UW patterns. Er ds (DP) when optic	gh-resistance grid. See also c-Series gages are supplied onal feature W or SE is not
	;	kanan Mjør		EA-XX-125AC-350 ED-DY-125AC-10C	$350 \pm 0.15\%$ $1000 \pm 0.3\%$ $1000 \pm 0.15\%$	W, E, L, LE, P E, L*, LE* W. SE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	S2K-XX-125AC-10C WA-XX-125AC-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	W*
0.125	0.250	0.125	0.125	WK-XX-125AC-10C EP-08-125AC-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.15\% \\ \end{array}$	W*
3.18	6.35	3.18	3.18	SA-XX-125AC-350 SK-XX-125AC-10C SD-DY-125AC-10C	$350 \pm 0.3\%$ 1000 ± 0.3% 1000 ± 0.6%	
MATRIX SIZE	0.40L x (0.22W 10.	2L x 5.6W	WD-DY-125AC-10C	$1000 \pm 0.0\%$ $1000 \pm 0.6\%$	
125AD		r F		Widely used general-p gages are supplied wit W or SE is not specifie	urpose gage. See al h duplex copper pac d.	so 125AC pattern. EK-Series Is (DP) when optional feature
GAGE		GRID WIDTH	OVERALL	EA-XX-125AD-120 ED-DY-125AD-350 EK-XX-125AD-350 WA-XX-125AD-120	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.3\% \\ 350 \pm 0.15\% \\ 120 \pm 0.3\% \end{array}$	W, E, L, LE, P E, L*, LE* W, SE W*
0.125	0.250	0.125	0.125	WK-XX-125AD-350 EP-08-125AD-120	350 ± 0.3% 120 ± 0.15%	W*
3.18	6.35	3.18	3.18	SA-XX-125AD-120 SK-XX-125AD-350	$\begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \\ \end{array}$	
MATRIX SIZE	0.40L x 0	.22W 10.	2L x 5.6W	WD-DY-125AD-350	$350 \pm 0.6\%$ $350 \pm 0.6\%$	
125AM		1.		General-purpose gage See the 125AC design See also 125UW patte	e with large solder ta for WA, SK, and ot ern.	ubs and high-resistance grid. Ther series with this grid size.
	Ŭ,					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125	0.300	0.125	0.200			
3.18	7.62	3.18	5.08	FA-XX-125AM-350	350 + 0 15%	F. P
MATRIX SIZE	0.50L x 0).28W 12	.7L x 7.1W	ED-DY-125AM-10C	1000 ± 0.3%	E.



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	al size shown. Irged when nec	essary for definition.	GAGE DESIGNATION	RES. IN OHMS		
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = I	Complete pat Matrix	tern inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE	
125AS				High-resistance gage.			
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-125AS-500 ED-DY-125AS-15C	500 ± 0.15% 1500 ± 0.4%	W, E, L, LE, P E	
0.125	0.250	0.125	0.125	WA-XX-125AS-500 WK-XX-125AS-15C	$500 \pm 0.3\% \\ 1500 \pm 0.3\% \\ 500 \pm 0.3\% \\ 1500 \pm 0.3\% \\ 1500 \pm 0.3\% \\ 1500 \pm 0.8\% \\ 15$	W* W*	
3.18	6.35	3.18	3.18	SA-XX-125AS-500 SK-XX-125AS-15C SD-DY-125AS-15C			
MATRIX SIZE	0.37L x 0	.21W	9.4L x 5.3W	WD-DY-125AS-15C	1500 ± 0.8%		
125BB	Linina			Narrow general-purpose gage with extended tabs.			
	, Aliik Iji			EA-XX-125BB-120	120 ± 0.15%	E, P	
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-125BB-350 WA-XX-125BB-120	$\begin{array}{c} 350 \pm 0.3\% \\ 120 \pm 0.3\% \end{array}$	E	
0.125	0.245	0.088	0.088	WK-XX-125BB-350 EP-08-125BB-120	350 ± 0.3% 120 ± 0.15%		
3.18	6.22	2.24	2.24	SA-XX-125BB-120 SK-XX-125BB-350 SD-DY-125BB-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.6\%$		
MATRIX SIZE	0.43L x 0	.22W	10.9L x 5.6W	WD-DY-125BB-350	350 ± 0.6%		
125BS		Ŵ		Narrow pattern primaril resistance.	y used in the WK an	d SK Series for 120-ohm	
Ň		U,U					
1X	(2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH				
0.125	0.250	0.050	0.060	ED-DY-125BS-120	120 ± 0.3%	E, L*, LE*	
3.18	6.35	1.27	1.52	WK-XX-125BS-120 SK-XX-125BS-120	$ \begin{array}{c} 120 \pm 0.3\% \\ 120 \pm 0.3\% \\ 100 \pm 0.2\% \end{array} $	W*	
MATRIX SIZE	0.38L x 0.	14W	9.7L x 3.6W	WD-DY-125BS-120	$120 \pm 0.6\%$ 120 ± 0.6%		



General Purpose Strain Gages - Linear Patterns

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ES = Each sectio S = Section (S1	n CP = = Sec 1) M =	Complete patte Matrix	rn inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125BT			General-purpose gage also 125BZ pattern.	with narrow grid and	d compact geometry. See	
1)	X	∎,∎ 2X				
GAGE	OVERALL	GRID	OVERALL	EA-XX-125BT-120 ED-DY-125BT-350	$120 \pm 0.15\%$ $350 \pm 0.3\%$ $120 \pm 0.3\%$	W, E, L, LE, P E, L*, LE*
0.125	0.215	0.062	0.062	WK-XX-125BT-120 WK-XX-125BT-350 FP-08-125BT-120	$350 \pm 0.3\%$ $120 \pm 0.15\%$	W*
3.18	5.46	1.57	1.57	SA-XX-125BT-120 SK-XX-125BT-350	$\begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	
MATRIX SIZE	0.37L x 0	.16W	9.4L x 4.1W	SD-DY-125BT-350 WD-DY-125BT-350	$\begin{array}{c} 350\pm0.6\%\\ 350\pm0.6\%\end{array}$	
125BZ	ł.			Narrow high-resistance pattern except for grid duplex copper dots (DI	e gage with compact I resistance. EK-Ser D) when optional fea	t geometry. Similar to 125BT ries gages are supplied with ture W or SE is not specified.
IX GAGE LENGTH	OVERALL	₽,₽ 2X GRID WIDTH	OVERALL	EA-XX-125BZ-350 ED-DY-125BZ-10C EK-XX-125BZ-10C	350 ± 0.15% 1000 ± 0.4% 1000 + 0.15%	W, E, L, LE, P E, L*, LE* W*
0.125	0.220	0.062	0.062	WA-XX-125BZ-350 WK-XX-125BZ-10C	$350 \pm 0.3\%$ $1000 \pm 0.3\%$	W*
3.18	5.59	1.57	1.57	SA-XX-125BZ-350 SK-XX-125BZ-10C	$350 \pm 0.3\%$ 1000 $\pm 0.3\%$	
MATRIX SIZE	0.29L x 0).13W	7.4L x 3.3W	WD-DY-125BZ-10C	$1000 \pm 0.8\%$ $1000 \pm 0.8\%$	
125CA	Ùmi	111		High-dissipation gage	with large solder tab	S.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125	0.315	0.180	0.180	EA-XX-125CA-120 ED-DY-125CA-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.3\% \\ 420 \pm 0.2\% \end{array}$	W, E, L, LE, P E, L*, LE*
3.18	8.00	4.57	4.57	WA-XX-125CA-120 WK-XX-125CA-350	$\begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \\ 120 \pm 0.15\% \end{array}$	W*
MATRIX SIZE	0.43L x 0	.26W	10.9L x 6.6W	WD-DY-125CA-350	350 ± 0.6%	



General Purpose Strain Gages - Linear Patterns

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125CH	rondinon				High-dissipation, low-re	esistance gage used	in eight-gage bridge circuits.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	, -1	OVERALL WIDTH			
0.125	0.290	0.175		0.175	EA-XX-125CH-060	60 ± 0.15%	W, E, SE, L, LE, P
3.18	7.37	4.45		4.45	WA-XX-125CH-060 WK-XX-125CH-175	$\begin{array}{c} 60 \pm 0.3\% \\ 175 \pm 0.3\% \\ 20 \pm 0.2\% \end{array}$	W* W*
MATRIX SIZE	0.40L x 0	.28W	10.	2L x 7.1W	SK-XX-125CH-060 SK-XX-125CH-175	$60 \pm 0.3\%$ 175 ± 0.3%	
125DP					High-resistance gage v 125UE patterns.	vith tab at each end o	of grid. See also 125DQ and
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI) -	OVERALL WIDTH			
0.125	0.270	0.125		0.125	EA-XX-125DP-350 ED-DY-125DP-10C	$\begin{array}{r} 350\ \pm\ 0.15\%\\ 1000\ \pm\ 0.3\%\end{array}$	E, L, LE E
3.18	6.86	3.18		3.18	EP-08-125DP-350 SA-XX-125DP-350	$350 \pm 0.15\%$ $350 \pm 0.3\%$ $1000 \pm 0.2\%$	
MATRIX SIZE	0.34L x 0	.19W	8.6	L x 4.8W	SD-DY-125DP-10C	$1000 \pm 0.3\%$ $1000 \pm 0.6\%$	
125DQ					Similar to 125DP patte pattern.	rn except for grid res	istance. See also 125UE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI) -	OVERALL WIDTH		120 + 0.15%	ELIE
					EA-77-15200-150	120 ± 0.15%	L, L, LL

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

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125EP				High-resistance gage pattern.	with tab at each sid	de of grid. See also 125EQ
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125	0.150	0.125	0.250	EA-XX-125EP-350 ED-DY-125EP-10C	$350 \pm 0.15\%$ $1000 \pm 0.3\%$	E, L, LE E
3.18	3.81	3.18	6.35	EP-08-125EP-350 SA-XX-125EP-350	$350 \pm 0.15\%$ $350 \pm 0.3\%$ $1000 \pm 0.3\%$	
MATRIX SIZE	0.28L x 0	.35W 7.	1L x 8.9W	SD-DY-125EP-10C	$1000 \pm 0.3\%$ 1000 ± 0.6%	
125EQ				Similar to 125EP pattern except for grid resistance.		
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125	0.150	0.125	0.250	EA-XX-125EQ-120 ED-DY-125EQ-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.3\% \\ 100 \pm 0.45\% \end{array}$	E, L, LE E
3.18	3.81	3.18	6.35	EP-08-125EQ-120 SA-XX-125EQ-120 SK XX 125EQ 250	$120 \pm 0.15\%$ $120 \pm 0.3\%$ $350 \pm 0.3\%$	
MATRIX SIZE	0.28L x (0.35W 7	1L x 8.9W	SD-DY-125EQ-350	350 ± 0.6%	
125GF				Very high resistance in compact grid geometry.		
1X		2X				
GAGE	OVERALL	GRID	OVERALL	1		

		273				
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH		
0.125	0.210	0.100)	0.100		
3.18	5.33	2.54		2.54	SK-XX-125GE-20C	2000 + 0.3%
MATRIX SIZE	0.28L x 0	.17W	7.1	L x 4.3W	WK-XX-125GF-20C	2000 ± 0.3%



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ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125HN	Ē.			Narrow general-purpos 125UE pattern.	e gage with tab at ea	ach end of grid. See also
	;					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125	0.275	0.062	0.062	EA-XX-125HN-120	120 ± 0.15%	E, L, LE
3.18	6.99	1.57	1.57	ED-DY-125HN-350 EP-08-125HN-120 SA-XX-125HN-120	$350 \pm 0.3\%$ 120 ± 0.15% 120 ± 0.3%	
MATRIX SIZE	0.41L x (0.16W 10.	4L x 4.1W	SK-XX-125HN-350	$350 \pm 0.3\%$	
125MG	cruinta 1	เลงราก		Dual-pattern gage for u dinal grid centerlines sp pattern.	se in back-to-back b baced 0.250 in (6.35	ending applications. Longitu- mm) apart. See also 125PC
	Will					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.220 CP	0.125 ES	0.375 CP	EA-XX-125MG-120	120 ± 0.2%	W, E, L, LE
3.18 ES	5.59 CP	3.18 ES	9.53 CP	WK-XX-125MG-350 WK-XX-125MG-350 SA-XX-125MG-120	$120 \pm 0.4\%$ $350 \pm 0.4\%$ $120 \pm 0.4\%$	W*
MATRIX SIZE	0.32L x ().47W 8.1	L x 11.9W	SK-XX-125MG-350	350 ± 0.4%	
125MK	nin:			Compact pattern for ap Very narrow grid geome (1.02 mm) apart.	oplications similar to etry. Longitudinal grid	those described for 125MG. d centerlines spaced 0.040 in
1	X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.235 CP	0.030 ES	0.130 CP	EA-XX-125MK-120	$120 \pm 0.2\%$ $120 \pm 0.4\%$	W, E
3.18 ES	5.97 CP	0.76 ES	3.30 CP	WK-XX-125MK-120 WK-XX-125MK-350 SA-XX-125MK-120	$350 \pm 0.4\%$ $120 \pm 0.4\%$ $120 \pm 0.4\%$	W*
MATRIX SIZE	0.37L x (0.21W 9.4	L x 5.3W	SK-XX-125MK-350	350 ± 0.4%	

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

GAGE PATTERN Actual size shown. Enlarged when necessary for definition.				GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125 PC		<u></u>		Dual-pattern gage for use in back-to-back bending applications. Longitudinal grid centerlines spaced 0.085 in (2.16 mm) apart. See also 125MG pattern. EK-Series gages are supplied with duplex copper pads (DP) when optional feature W or SE is not specified.		
				EA-XX-125PC-120 EA-XX-125PC-350 ED-DY-125PC-350 ED-DY-125PC-10C EK-XX-125PC-10C	$120 \pm 0.2\% \\ 350 \pm 0.2\% \\ 350 \pm 0.4\% \\ 1000 \pm 0.4\% \\ 1000 \pm 0.2\% \\ 100$	W, E, L, LE W, E, L, LE E E W, SE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-125PC-120 WA-XX-125PC-350	120 ± 0.4% 350 ± 0.4%	W* W*
0.125 ES	0.205 CP	0.065 ES	0.150 CP	WK-XX-125PC-350 WK-XX-125PC-10C	$\begin{array}{c} 350 \pm 0.4\% \\ 1000 \pm 0.4\% \end{array}$	W* W*
3.18 ES	5.21 CP	1.65 ES	3.81 CP	SA-XX-125PC-120 SA-XX-125PC-350 SK-XX-125PC-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$ $350 \pm 0.4\%$	
MATRIX SIZE	0.29L x (0.23W 7.4	1L x 5.8W	SK-XX-125PC-10C	1000 ± 0.4%	
125UE (C' FEATURE				General-purpose gage with large tab at each end of grid. Exposed solder tab area 0.08 x 0.07 in (2.0 x 1.8 mm).		
	Ţ			_		CEA-Series Strain Gages feature large copper
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	-		solder tabs and a completely encapsulated grid.
0.125	0.470	0.125	0.125			
3.18	11.94	3.18	3.18	CEA-XX-125UE-120	120 ± 0.3%	
MATRIX SIZE	0.57L x 0.20W 14.5L x 5.1W		CEA-XX-125UE-350	$350\pm0.3\%$		
125UN (C' FEATURE				General-purpose gage with narrow geometry. Exposed solder tab area 0.06 x 0.05 in (1.5 x 1.1 mm). See also 125UW pattern.		
						CEA-Series Strain Gages feature large copper solder tabs and a completely
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	1		encapsulated grid.
0.125	0.275	0.100	0.120	1		(preattached leadwire cables)
3.18	6.99	2.54	3.05	CEA-XX-125UN-120	120 + 0.2%	
MATRIX SIZE	0.38L x 0	.19W 9.7	7L x 4.8W	CEA-XX-125UN-350	$350 \pm 0.3\%$	



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu Enla	al size shown. Irged when neo	cessary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectionCP = Complete patterninchS = Section (S1= Sec 1)M = Matrixmillimeter				Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125UW		ι.	C' FEATURE	General-purpose gage. Exposed solder tab area 0.10 x 0.07 (2.5 x 1.8 mm). See also 125UN pattern.		
0405			OVERAL			CEA-Series Strain Gages feature large copper solder tabs and a completely encapsulated grid
LENGTH	LENGTH	WIDTH	WIDTH			Available with Option P2
0.125	0.325	0.180	0.180			(preattached leadwire cables)
3.18	8.26	4.57	4.57	CEA-XX-125UW-120	120 ± 0.3%	
MATRIX SIZE	0.42L x 0.27W 10.7L		10.7L x 6.9W	CEA-XX-125UW-350	350 ± 0.3%	
187 BB				Narrow general-purpose gage with long tabs. See also 187UW pattern.		
		4 		E4-XX-187BB-120	120 + 0 15%	WELLED
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-187BB-350 WA-XX-187BB-120	$350 \pm 0.3\%$ $120 \pm 0.3\%$	W, L, L, LL, T E, L*, LE* W*
0.187	0.368	0.131	0.131	WK-XX-187BB-350 EP-08-187BB-120	$\begin{array}{c} 350 \pm 0.3\% \\ 120 \pm 0.15\% \\ 120 \pm 0.3\% \\ 350 \pm 0.3\% \\ 250 \pm 0.0\% \end{array}$	W*
4.75	9.35	3.33	3.33	SA-XX-187BB-120 SK-XX-187BB-350		
MATRIX SIZE	0.55L x 0.26W 14.0L x 6		14.0L x 6.6W	WD-DY-187BB-350	$350 \pm 0.6\%$ $350 \pm 0.6\%$	
187UW		٤(C' FEATURE	General-purpose gage.	Exposed solder tab	area 0.10 x 0.07 in

10/0			'C' FE	EATURE	General-purpose gage. Exposed solder tab area 0.10 x 0.07 in (2.5 x 1.8 mm).		
							CEA-Series Strain Gages
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			solder tabs and a completely encapsulated grid.
0.187	0.387	0.18	0	0.180			Available with Option P2
4.75	9.83	4.57	7	4.57	CFA-XX-18711W-120	120 + 0.3%	
MATRIX SIZE	0.49L x 0.27W 12		12.4	4L x 6.9W	CEA-XX-187UW-350	$350 \pm 0.3\%$	


General Purpose Strain Gages - Linear Patterns

ES Each section OP = Complete pattern millimeter Incer asside vises under in spaces 0 and vises marked XX. OPTIONS AVAILABLE 200MB Incer asside vises or P is specified. Incer asside vises or P is specified. Ord centerlines are spaced 0.030 in (0.8 mm) apart. Ord centerlines are spaced 0.030 in (0.8 mm) apart. 200MB Incer asside vises or P is specified. Use 1, LE or P is specified. W. E, L, LE W. E, L, LE 300 CP 0.200 ES 0.300 CP 0.200 ES 0.300 CP 120 ± 0.2% WX-XX-200MB-120 WX-XX-200MB-120 WX-XX-200MB-130 120 ± 0.2% 120 ± 0.4% 350 ± 0.4% W. E, L, LE W. MATRIX SIZE 0.50L x 0.21W 12.7L x 5.3W SK XX-200MB-120 WX-XX-200MB-300 120 ± 0.4% 350 ± 0.4% W. E, L, LE W. 230DS Intert deside S-10 S.84 9.53 0.620 0.76 S.64 SK XX-200MB-300 120 ± 0.15% SK XX-200MB-300 120 ± 0.15% SIG ± 0.4% E, SE, L, LE 230DS 0.375 0.022 0.072 SK XX-200MB-120 SIG ± 0.4% 120 ± 0.15% SIG ± 0.4% E, SE, L, LE CAGE VERALL LENGTH GRID WDTH WDTH WDTH WW SG ± 0.4% SG ± 0.4% SIG ± 0.15% S.54 0.350 </th <th>GAGE PAT</th> <th>TERN Enla</th> <th>arged when necessa</th> <th>ry for definition.</th> <th>GAGE DESIGNATION</th> <th>RES. IN OHMS Tolerance is</th> <th></th>	GAGE PAT	TERN Enla	arged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
COOMB Dual-grid gage. Narrow pattern geometry. Grid centerlines are spaced 0.030 in (0.8 mm) apart. GAGE Display and the space of the	ES = Each section S = Section (S1	en CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
IX ZX IX ZX IEINGTH OVERALL IEINGTH OVERALL WIDTH OVERALL WIDTH ID 0 ± 0.2% WINCX 200MB-120 WAXX 200MB-100 WAXX 200MB-100 WAXX 200MB-100 WAXX 200MB-100 WAXX 200MB-100 WA	200MB				Dual-grid gage. Narrov 0.030 in (0.8 mm) apar	v pattern geometry. t.	Grid centerlines are spaced
GAGE LENGTH OVERALL LENGTH GPID WIDTH OVERALL WIDTH Part of the second second second s		₩ 1X	2x				
0.200 ES 0.330 CP 0.020 ES 0.130 CP EA.XX-200MB-120 WA.XX-200MB-120 WA.XX-200MB-120 WA.XX-200MB-120 SA.XX-200B-120 SA.XX-200B-120 SA.XX-200DS-120 SA.XX-200AE SA.XX-200AE SA.XX-200AE SA.XX-200AE SA.XX-200AE SA.XX	GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
5.08 ES 8.38 CP 0.51 ES 3.30 CP WAXX2200MB-120 SA-XX-200MB-130 SA-XX-200MB-130 SA-XX-200MB-130 SK-X	0.200 ES	0.330 CP	0.020 ES	0.130 CP	EA-XX-200MB-120	120 ± 0.2%	W, E, L, LE
MATRIX SIZE 0.50L x 0.21W 12.7L x 5.3W SX-XX-200MB-120 SX-XX-200MB-350 120 ± 0.4% 230DS Image: state s	5.08 ES	8.38 CP	0.51 ES	3.30 CP	WA-XX-200MB-120 WK-XX-200MB-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$ $120 \pm 0.4\%$	W* W*
230DS General-purpose gage with very narrow geometry. IX 2X GAGE OVERALL LENGTH GRID WIDTH OVERALL WIDTH EA-XX-230DS-120 UMC-XX-230DS-120 120 ± 0.15% 120 ± 0.3% 120 ± 0.3% E, SE, L, LE C.320 0.375 0.022 0.030 K-XX-230DS-120 WK-XX-230DS-120 120 ± 0.15% 120 ± 0.3% E, SE, L, LE MATRIX SIZE 0.50L x 0.12W 12.7L x 3.0W SD-DY-230DS-350 350 ± 0.3% 120 ± 0.3% E, SE, L, LE CAGE General-purpose gage with high-dissipation grid. See also SD-DY-230DS-350 350 ± 0.15% 350 ± 0.3% W, E, L, LE, P CAGE General-purpose gage with high-dissipation grid. See also See also SD-DY-230DS-350 350 ± 0.15% 350 ± 0.3% W, E, L', LE, P CAGE General-purpose gage with high-dissipation grid. See also See also SD-DY-250AE-10C MO ± 0.3% 350 ± 0.15% W, W, E, L', LE, P CAGE General-purpose gage with high-dissipation grid. See also SD-DY-250AE-10C SD = 0.3% 350 ± 0.15% W''' CAGE OVERALL VM * General-purpose gage with high-dissipation grid. See also SD = 0.3% 350 ± 0.15% SD = 0.3% 350 ± 0.15%	MATRIX SIZE	0.50L x ().21W 12.	7L x 5.3W	SK-XX-200MB-120 SK-XX-200MB-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	
IX 2X GAGE OVERALL LENGTH GRID WIDTH OVERALL WIDTH OVERALL EA-XX-230DS-120 120 ± 0.15% S50 ± 0.3% 120 ± 0.13% 120 ± 0.3% 120 ± 0.3% 120 ± 0.3% 120 ± 0.3% 120 ± 0.3% 120 ± 0.15% 120 ± 0.15% 120 ± 0.15% 120 ± 0.15% 120 ± 0.15% 120 ± 0.3% 350 ± 0.3% E-SE, L, LE MATRIX SIZE 0.50L × 0.12W 12.7L × 3.0W EA-XX-230DS-120 SA-XX-230DS-350 SD-DY-230DS-350 120 ± 0.15% 120 ± 0.3% SD ± 0.3% E.SE, L, LE ZSOAE General-purpose gage with high-dissipation grid. See also 250AF pattern. EA-XX-250AE-350 ED-DY-230B-310 350 ± 0.6% SD ± 0.5% 1000 ± 0.3% SD ± 0.3% SD ± 0.5% SD ± 0	230DS				General-purpose gage	with very narrow ge	ometry.
GAGE LENGTH OVERALL LENGTH GRID WIDTH OVERALL WIDTH EA-XX-230DS-120 ED-DY-230DS-350 120 ± 0.15% 350 ± 0.3% E, SE, L, LE 0.230 0.375 0.022 0.030 WK-XX-230DS-120 WK-XX-230DS-350 120 ± 0.3% E, SE, L, LE 5.84 9.53 0.56 0.76 SA-XX-230DS-120 SK-XX-230DS-120 120 ± 0.3% E MATRIX SIZE 0.50L x 0.12W 12.7L x 3.0W SD-DY-230DS-350 350 ± 0.3% E Z50AE		1X	پ 2X				
0.230 0.375 0.022 0.030 WA-XX-230DS-320 WK-XX-230DS-350 350 ± 0.3% 350 ± 0.3% 5.84 9.53 0.56 0.76 SA-XX-230DS-120 SA-XX-230DS-350 120 ± 0.15% 350 ± 0.3% MATRIX SIZE 0.50L × 0.12W 12.7L × 3.0W SK-XX-230DS-350 350 ± 0.3% Z50AE General-purpose gage with high-dissipation grid. See also 250AF pattern. General-purpose gage with high-dissipation grid. See also 250AF pattern. GAGE OVERALL LENGTH GRID WIDTH OVERALL WIDTH EA-XX-250AE-350 ED-DY-250AE-10C WK-XX-250AE-350 350 ± 0.15% 350 ± 0.15% 350 ± 0.3% W, E, L, LE, P E, L*, LE* W* 0.250 0.415 0.250 0.250 0.250 350 ± 0.3% 350 ± 0.3% W* 0.250 0.415 0.250 0.250 0.57L × 0.36W 14.5L × 9.1W WD-DY-250AE-10C 1000 ± 0.3% 350 ± 0.3% W*	GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-230DS-120 ED-DY-230DS-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.3\% \\ 120 \pm 0.2\% \end{array}$	E, SE, L, LE E
5.84 9.53 0.56 0.76 EA-XX-230DS-120 SA-XX-230DS-120 SK-XX-230DS-350 120 ± 0.3% 350 ± 0.3% 350 ± 0.3% 350 ± 0.6% MATRIX SIZE 0.50L x 0.12W 12.7L x 3.0W SD-DY-230DS-350 350 ± 0.3% 350 ± 0.6% 250AE General-purpose gage with high-dissipation grid. See also 250AF pattern. General-purpose gage with high-dissipation grid. See also 250AF pattern. W, E, L, LE, P E, L*, LE* Case of the tensor OVERALL LENGTH OVERALL WIDTH OVERALL WIDTH WIDTH WIDTH WERALL State 350 ± 0.15% BA-XX-250AE-350 W, E, L, LE, P BD-V250AE-10C 0.250 0.415 0.250 0.250 0.250 350 ± 0.15% BC-XX-250AE-350 350 ± 0.15% BC-XX-250AE-350 W* 0.250 0.415 0.250 0.250 350 ± 0.15% BC-XX-250AE-350 350 ± 0.15% BC-XX-250AE-350 W* 0.250 0.415 0.250 0.250 SK-XX-250AE-350 SK-XX-250AE-350 350 ± 0.15% BC-XX-250AE-350 W* MATRIX SIZE 0.57L x 0.36W 14.5L x 9.1W WD-DY-250AE-10C 1000 ± 0.6% W	0.230	0.375	0.022	0.030	WA-XX-230DS-120 WK-XX-230DS-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $120 \pm 0.15\%$	
MATRIX SIZE 0.50L × 0.12W 12.7L × 3.0W SIX DV 230D3 530 350 ± 0.6% 250AE General-purpose gage with high-dissipation grid. See also 250AF pattern. General-purpose gage with high-dissipation grid. See also 250AF pattern. W, E, L, LE, P GAGE OVERALL LENGTH GRID WIDTH OVERALL WIDTH GVERALL WIDTH W, E, L, LE, P 0.250 0.415 0.250 0.250 0.250 350 ± 0.15% SA-XX-250AE-350 350 ± 0.15% SA-XX-250AE-350 W, E, L, LE, P W* WiDTH WIDTH WIDTH WWT W W* 0.250 0.415 0.250 0.250 0.250 350 ± 0.3% SA-XX-250AE-350 350 ± 0.3% SD ± 0.3% SD ± 0.3% W* MATRIX SIZE 0.57L x 0.36W 14.5L x 9.1W WD-DY-250AE-10C 1000 ± 0.6% 1000 ± 0.6%	5.84	9.53	0.56	0.76	SA-XX-230DS-120 SK-XX-230DS-120	$120 \pm 0.15\%$ $120 \pm 0.3\%$ $350 \pm 0.3\%$	
250AE General-purpose gage with high-dissipation grid. See also 250AF pattern. GAGE OVERALL LENGTH GRID WIDTH OVERALL WIDTH WIDTH WIDTH WIDTH WWDTH WWDTH 1000 ± 0.3% 350 ± 0.15% 1000 ± 0.3% 350 ± 0.15% 350 ± 0.15% 350 ± 0.3% 350 ± 0.3% 350 ± 0.3% 350 ± 0.3% 350 ± 0.3% 350 ± 0.3% 350 ± 0.3% 350 ± 0.15% 350 ± 0.15% 350 ± 0.15% 350 ± 0.15% 350 ± 0.15% 350 ± 0.15% 350 ± 0.15% 350 ± 0.15% 350 ± 0.3\% 350 ± 0.3\%	MATRIX SIZE	0.50L x (0.12W 12.	7L x 3.0W	SD-DY-230DS-350	350 ± 0.6%	
GAGE LENGTH OVERALL LENGTH GRID WIDTH OVERALL WIDTH EA-XX-250AE-350 ED-DY-250AE-10C 350 ± 0.15% 1000 ± 0.3% 350 ± 0.3% W, E, L, LE, P E, L*, LE* 0.250 0.415 0.250 0.250 0.250 350 ± 0.15% SA-XX-250AE-350 350 ± 0.3% 350 ± 0.3% W* 6.35 10.54 6.35 6.35 6.35 6.35 SK-XX-250AE-10C SA-XX-250AE-10C 350 ± 0.3% 350 ± 0.3% W* MATRIX SIZE 0.57L x 0.36W 14.5L x 9.1W WD-DY-250AE-10C 1000 ± 0.6% Houston 1000 ± 0.6%	250AE	`mun	ínum.		General-purpose gage 250AF pattern.	with high-dissipation	n grid. See also
GAGE LENGTH OVERALL LENGTH GRID WIDTH OVERALL WIDTH OVERALL WIDTH Interpretation 0.30 ± 0.13 % 1000 ± 0.3% W, E, E, E, T, EE, T 0.250 0.415 0.250 0.250 0.250 0.250 1000 ± 0.3% W* 6.35 10.54 6.35 6.35 6.35 SK-XX-250AE-10C 1000 ± 0.3% W* MATRIX SIZE 0.57L x 0.36W 14.5L x 9.1W WD-DY-250AE-10C 1000 ± 0.6% 1000 ± 0.6%		-			EA.YY.250AE.350	250 ± 0.15%	WELLEP
0.250 0.415 0.250 0.250 0.250 0.250 0.835 10.54 6.35 6.35 6.35 6.35 6.35 6.35 6.35 6.35 6.35 6.35 0.57L x 0.36W 14.5L x 9.1W WK-XX-250AE-10C 1000 ± 0.3% W* MATRIX SIZE 0.57L x 0.36W 14.5L x 9.1W WD-DY-250AE-10C 1000 ± 0.6% W*	GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-250AE-350 WA-XX-250AE-350	$1000 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.3\%$	♥♥, ┕, └, └, └` E, L*, LE* W*
6.35 10.54 6.35 6.35 SA-XX-250AE-350 SK-XX-250AE-10C 350 ± 0.3% 1000 ± 0.3% MATRIX SIZE 0.57L x 0.36W 14.5L x 9.1W WD-DY-250AE-10C 1000 ± 0.6%	0.250	0.415	0.250	0.250	WK-XX-250AE-10C EP-08-250AE-350	1000 ± 0.3% 350 ± 0.15%	W*
MATRIX SIZE 0.57L x 0.36W 14.5L x 9.1W SD-DY-250AE-10C 1000 ± 0.6% 1000 ± 0.6%	6.35	10.54	6.35	6.35	SA-XX-250AE-350 SK-XX-250AE-10C	350 ± 0.3% 1000 ± 0.3%	
	MATRIX SIZE	0.57L x (D.36W 14.	5L x 9.1W	SD-DY-250AE-10C WD-DY-250AE-10C	1000 ± 0.6% 1000 ± 0.6%	



General Purpose Strain Gages - Linear Patterns

GAGE PATTERN Actual size shown. Enlarged when necessary for definitio					GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = I	Complete p Matrix	attern	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250AF					General-purpose gage pattern except for resist	e with high-dissipat tance.	ion grid. Similar to 250AE
					FA-XX-250AF-120	120 + 0 15%	WELLEP
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	4	OVERALL WIDTH	ED-DY-250AF-350 WA-XX-250AF-120	350 ± 0.3% 120 ± 0.3%	E, L*, LE* W*
0.250	0.415	0.250)	0.250	WK-XX-250AF-350 EP-08-250AF-120	350 ± 0.3% 120 ± 0.15%	W*
6.35	10.54	6.35		6.35	SA-XX-250AF-120 SK-XX-250AF-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$	
MATRIX SIZE	0.57L x ().36W	14.5	5L x 9.1W	WD-DY-250AF-350	$350 \pm 0.6\%$ $350 \pm 0.6\%$	
250BA	, mi	n.			Primarily used in eight-	gage bridge circuits.	
	:						
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	-	OVERALL WIDTH	EA-XX-250BA-175 ED-DY-250BA-500	$175 \pm 0.15\%$ $500 \pm 0.3\%$	W, E, L, LE, P E, L*, LE*
0.250	0.375	0.125	5	0.125	WA-XX-250BA-175 WK-XX-250BA-500	$1/5 \pm 0.3\%$ 500 ± 0.3%	W* W*
6.35	9.53	3.18		3.18	SA-XX-250BA-175 SK-XX-250BA-500 SD-DX-250BA-500	$175 \pm 0.3\%$ 500 ± 0.3% 500 ± 0.6%	
MATRIX SIZE	0.53L x ().22W	13.5	5L x 5.6W	WD-DY-250BA-500	500 ± 0.6%	
250BB	-hitchick				General-purpose gage	with large solder tab	IS.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	1	OVERALL WIDTH			
0.250	0.490	0.175		0.175			
6.35	12.45	4.45		4.45	EA-XX-250BB-120 ED-DY-250BB-350	120 ± 0.15% 350 ± 0.3%	W, E, L, LE, P F I * I F*
MATRIX SIZE	0.64L x 0).27W	16.3	3L x 6.9W	EP-08-250BB-120	120 ± 0.15%	_, _ ,

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	al size shown. Arged when necess	ary for definition	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	n CP = = Sec 1) M =	Complete patterr Matrix	n inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250BF				General-purpose gage Similar to 250BG patte 250UW patterns. EK-Se (DP) when optional fea	with high-resistan ern except for resist eries gages are supp ture W or SE is not s	ce grid. Compact geometry. tance. See also 250BM and blied with duplex copper pads specified.
				EA-XX-250BF-350 ED-DY-250BF-10C FK-XX-250BF-10C	$350 \pm 0.15\%$ $1000 \pm 0.3\%$ $1000 \pm 0.15\%$	W, E, L, LE, P E, L*, LE* W. SE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	S2K-XX-250BF-10C WA-XX-250BF-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	W* W*
0.250	0.375	0.125	0.125	WK-XX-250BF-10C EP-08-250BF-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.15\% \\ 250 \pm 0.20\% \end{array}$	
6.35	9.53	3.18	3.18	SA-XX-250BF-350 SK-XX-250BF-10C	$350 \pm 0.3\%$ 1000 ± 0.3% 1000 ± 0.6%	
MATRIX SIZE	0.52L x (0.22W 1	3.2L x 5.6W	WD-DY-250BF-10C	$1000 \pm 0.6\%$	
250BG	:[[[]]]		Widely used general-p 250BF and 250UN patt	ourpose gage. Com erns.	pact geometry. See also
GAGE	OVERALL	GRID	OVERALL	EA-XX-250BG-120 ED-DY-250BG-350 WA-XX-250BG-120	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.3\% \\ 120 \pm 0.3\% \\ 250 \pm 0.2\% \end{array}$	W, E, L, LE, P E, L*, LE* W*
0.250	0.375	0.125	0.125	EA-XX-250BG-350 EP-08-250BG-100	$100 \pm 0.15\%$ $120 \pm 0.15\%$	VV ~
6.35	9.53	3.18	3.18	SA-XX-250BG-120 SK-XX-250BG-350	$\begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	
MATRIX SIZE	0.52L x ().22W 1:	3.2L x 5.6W	WD-DY-250BG-350	$350 \pm 0.6\%$ $350 \pm 0.6\%$	
250GG	Π	1		Narrow high-resistance	egage.	
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	•		
0.250	0.352	0.100	0.100			
6.35	8.94	2.54	2.54			
MATRIX SIZE	0.43L x	0.18W 1	0.9L x 4.6W	EA-XX-250GG-10C	1000 ± 0.15%	W, E, L, LE, P



General Purpose Strain Gages - Linear Patterns

		al size shown		CACE		
ES = Each section S = Section (S1:	IERN Enla n CP = = Sec 1) M = I	rrged when necessa Complete pattern Matrix	ry for definition. inch millimeter	DESIGNATION Insert desired S-T-C number in spaces marked XX.	Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250BK	- TT	TI		High-resistance gage v output applications or u	with good power dis se on plastics.	sipation capability for high-
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250	0.430	0.175	0.175	EA-XX-250BK-10C	1000 ± 0.15%	W, E, L, LE, P
6.35	10.92	4.45	4.45	WA-XX-250BK-10C WK-XX-250BK-30C SA-XX-250BK-10C	$1000 \pm 0.3\%$ $3000 \pm 0.3\%$ $1000 \pm 0.3\%$	W* W*
MATRIX SIZE	0.58L x 0).27W 14.	7L x 6.9W	SK-XX-250BK-30C	$3000 \pm 0.3\%$	
250BM	- [[1]	/. -		A higher resistance ver	rsion of the 250BF pa	attern.
GAGE	OVERALL LENGTH	GRID	OVERALL	EA-XX-250BM-500 ED-DY-250BM-15C WA-XX-250BM-500	$500 \pm 0.15\% \\ 1500 \pm 0.3\% \\ 500 \pm 0.3\%$	W, E, L, LE, P E, L*, LE* W*
0.250	0.375	0.125	0.125	WK-XX-250BM-15C EP-08-250BM-500	1500 ± 0.3% 500 ± 0.15%	W*
6.35	9.53	3.18	3.18	SA-XX-250BM-500 SK-XX-250BM-15C	$500 \pm 0.3\% \\ 1500 \pm 0.3\% \\ 1500 \pm 0.6\%$	
MATRIX SIZE	0.58L x ().27W 14.	7L x 6.9W	WD-DY-250BM-15C	$1500 \pm 0.6\%$ $1500 \pm 0.6\%$	
250BP	.nî	n		A general-purpose gage in SK and WK Series.	e used primarily to ob	tain 120-ohm grid resistance
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250	0.375	0.125	0.125	SK-XX-250BP-120 WK-XX-250BP-120	$120 \pm 0.3\%$ $120 \pm 0.3\%$	W/*
6.35	9.53	3.18	3.18	ED-DY-250BP-120 SD-DY-250BP-120	$\begin{array}{c} 120 \pm 0.3\% \\ 120 \pm 0.6\% \end{array}$	E, L*, LE*
MATRIX SIZE	0.53L x 0	.22W 13.5	5L x 5.6W	WD-DY-250BP-120	$120 \pm 0.6\%$	

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	iai size snown. Irged when necessai	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1	on CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250DM	ſſſ	<u>.</u> Annon /		General-purpose gage 250EM pattern.	e with solder tab at	each end of grid. See also
	-	- -		E4-XX-250DM-120	120 + 0 15%	FLIF
GAGE	OVERALL	GRID	OVERALL	ED-DY-250DM-350	$350 \pm 0.3\%$	E, L*, LE*
0.250	0.450	0.250	0.250	WA-XX-250DM-120 WK-XX-250DM-350 EP-08-250DM-120	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $120 \pm 0.15\%$	
6.35	11.43	6.35	6.35	SK-XX-250DM-120 SK-XX-250DM-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$	
MATRIX SIZE	0.61L x (0.35W 15.	5L x 8.9W	SD-DY-250DM-350 WD-DY-250DM-350	$350 \pm 0.6\%$ $350 \pm 0.6\%$	
250EM	È.	ĨĨ.		General-purpose gage side of grid.	. Similar to 250DM p	pattern but with tab at each
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-250EM-120 ED-DY-250EM-350 WA-XX-250EM-120	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.3\% \\ 120 \pm 0.3\% \end{array}$	E, L, LE E, L*, LE*
0.250	0.290	0.250	0.400	WK-XX-250EM-350 EP-08-250EM-120 SA-XX-250EM-120	$350 \pm 0.3\%$ 120 ± 0.15% 120 ± 0.3%	
MATRIX SIZE	0.44L x	0.48W 11.2	L x 12.2W	SK-XX-250EM-350 SD-DY-250EM-350 WD-DY-250EM-350	$350 \pm 0.3\%$ $350 \pm 0.6\%$ $350 \pm 0.6\%$	
250MQ				Dual pattern for back- centerlines are spaced pattern. EK-Series gag when optional feature	to-back bending app d 0.185 in (4.70 mm) ges are supplied with W or SE is not spec	lications. Longitudinal grid) apart. See also 250PD h duplex copper pads (DP) ified.
				EA-XX-250MQ-350	350 ± 0.2%	W. E. L. LE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-250MQ-10C EK-XX-250MQ-10C	1000 ± 0.4% 1000 ± 0.2%	E, L*, LE* W. SE
0.250ES	0.375 CP	0.125 ES	0.310 CP	WA-XX-250MQ-350 WK-XX-250MQ-10C SA-XX-250MQ-350	$350 \pm 0.3\%$ 1000 ± 0.4% $350 \pm 0.3\%$	W* W*
6.35 ES	9.53 CP	3.18 ES	7.87 CP	SK-XX-250MQ-10C	$1000 \pm 0.4\%$ $1000 \pm 0.8\%$	
MATRIX SIZE	0.47L x 0	0.40W 11.9I	_ x 10.2W	WD-DY-250MQ-10C	1000 ± 0.8%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each sectio S = Section (S1:	TERN Actu Enla n CP = = Sec 1) M =	al size shown. Irged when necess Complete pattern Matrix	ary for definition inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250PD	nini			Dual-element pattern v (3.30 mm) apart. See supplied with duplex co is not specified.	vith longitudinal grid also 250MQ pattern opper pads (DP) wh	centerlines spaced 0.130 in . EK-Series gages are en optional feature W or SE
	-			EA-XX-250PD-120 EA-XX-250PD-350 ED-DY-250PD-350 EK-XX-250PD-10C S2K-XX-250PD-10C WA-XX-250PD-120	$\begin{array}{c} 120 \pm 0.2\% \\ 350 \pm 0.2\% \\ 350 \pm 0.4\% \\ 1000 \pm 0.2\% \\ 1000 \pm 0.4\% \\ 120 \pm 0.3\% \end{array}$	W, E, L, LE W, E, L, LE E W, SE W*
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA XX-250PD-350 WA-XX-250PD-350 WK-XX-250PD-350	$350 \pm 0.3\%$ $350 \pm 0.4\%$ $1000 \pm 0.4\%$	W* W* W*
0.250ES	0.358 CP	0.110 ES	0.240 CP	SA-XX-250PD-120 SA-XX-250PD-350 SK-XX-250PD-350	$\begin{array}{c} 120 \pm 0.4\% \\ 350 \pm 0.4\% \\ 350 \pm 0.4\% \end{array}$	
6.35 ES	9.09 CP	2.79 ES	6.10 CP	SK-XX-250PD-10C SD-DY-250PD-350	$1000 \pm 0.4\%$ $350 \pm 0.8\%$	
MATRIX SIZE	0.44L x 0	.32W 11.2	Lx 8.1W	WD-DY-250PD-350	350 ± 0.8%	
250SD		Ĺ		General-purpose gage	for use near abutme	ents and in restricted areas.
GAGE		GRID	OVERALL	EA-XX-250SD-350 ED-DY-250SD-10C	350 ± 0.15% 1000 ± 0.3%	W, E, L, LE, P E, L*. LE*
LENGTH	LENGTH	WIDTH	WIDTH	WA-XX-250SD-350 WK-XX-250SD-10C	$\begin{array}{r} 350 \pm 0.3\% \\ 1000 \pm 0.3\% \end{array}$	W* W*
0.250	0.320	0.120	0.190	EP-08-250SD-350 SA-XX-250SD-350	$\begin{array}{c} 350 \pm 0.15\% \\ 350 \pm 0.3\% \end{array}$	
6.35	8.13	3.05	4.83	SK-XX-250SD-10C SD-DY-250SD-10C	$\begin{array}{c} 1000 \pm 0.3\% \\ 1000 \pm 0.6\% \end{array}$	
MATRIX SIZE	0.45L x 0.	30W 11.4	L x 7.6W	WD-DY-250SD-10C	1000 ± 0.6%	
250UN		C' FEATURE		General-purpose gage 0.08 x 0.05 in (2.0 x 1.	with narrow geome 1 mm). See also 250	etry. Exposed solder tab area DUW pattern.
						CEA-Series Strain Gages feature large copper
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			solder tabs and a completely encapsulated grid.
0.250	0.415	0.120	0.120			Available with Option P2 (preattached leadwire cables).
6.35	10.54	3.05	3.05	CEA-XX-250UN 120	120 + 0.2%	
MATRIX SIZE	0.52L x ().22W 1	3.2L x 5.6W	CEA-XX-250UN-120	$350 \pm 0.3\%$	

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each section	TERN Actu Enla	al size shown. Irged when necessa Complete pattern	ry for definition.	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE,	OPTIONS AVAILABLE
S = Section (S1	= Sec 1) M = I	Matrix	millimeter	marked XX.	or P is specified.	
250UW		(C' FEATU	RE	General-purpose gage. I (2.5 x 1.8 mm). See also	Exposed solder tab ar 250UN pattern.	rea 0.10 x 0.07 in
	, Line and the second s	<u> </u>				CEA-Series Strain Gages feature large copper
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			solder tabs and a completely encapsulated grid.
0.250	0.450	0.180	0.180			Available with Option P2 (preattached leadwire cables).
6.35	11.43	4.57	4.57	CEA-XX-250UW-120 CEA-XX-250UW-175 CEA-XX-250UW-350	$120 \pm 0.3\%$ $175 \pm 0.3\%$ $250 \pm 0.3\%$	()
MATRIX SIZE	0.55L x	0.27W 14.	0L x 6.9W	CEA-XX-2500W-350 CEA-XX-250UW-10C	$1000 \pm 0.3\%$	
350DD GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	General-purpose gage end of grid. EA-XX-350DD-350 ED-DY-350DD-10C WA-XX-350DD-350 WK-XX-350DD-10C	with narrow pattern 350 ± 0.15% 1000 ± 0.3% 350 ± 0.3% 1000 ± 0.3%	geometry and tab at each E, L, LE E
0.350	0.500	0.100	0.100	EP-08-350DD-350 SA-XX-350DD-350	$350 \pm 0.15\%$ $350 \pm 0.3\%$	
8.89	12.70	2.54	2.54	SK-XX-350DD-10C SD-DY-350DD-10C	$\begin{array}{c} 1000 \pm 0.3\% \\ 1000 \pm 0.6\% \end{array}$	
MATRIX SIZE	0.61L x 0	.18W 15.5I	_ x 4.6W	WD-DY-350DD-10C	1000 ± 0.6%	
375 BG				General-purpose gage	. See also 375UW p	pattern.
				EA-XX-375BG-120	120 ± 0.15%	W. E. L. LE. P
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-375BG-350 WA-XX-375BG-120	350 ± 0.3% 120 ± 0.3%	E, L*, LE* W*
0.375	0.563	0.187	0.187	WK-XX-375BG-350 EP-08-375BG-120	$350 \pm 0.3\%$ 120 ± 0.15% 120 + 0.2%	W*
9.53	14.30	4.75	4.75	SA-XX-375BG-120 SK-XX-375BG-350 SD-DY-375BG-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.6\%$	
MATRIX SIZE	0.71L X 0	.29W 18.0L	x 7.4W	WD-DY-375BG-350	350 ± 0.6%	



General Purpose Strain Gages - Linear Patterns

GAGE PATTERN Actual size shown.					GAGE	RES. IN OHMS	
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = I	Complete p Vatrix	attern	inch millimeter	DESIGNATION Insert desired S-T-C number in spaces marked XX	Tolerance is increased when Option W, E, SE, LE, or P is specified	OPTIONS AVAILABLE
					manioa / a li		
375UW	, Mi	ìn	'C' F	EATURE	General-purpose gage. mm).	Exposed solder tab a	area 0.10 x 0.07 in (2.5 x 1.8
							CEA-Series Strain Gages feature large copper solder tabs and a completely
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI) H	OVERALL WIDTH			encapsulated grid.
0.375	0.575	0.180		0.180			Available with Option P2 (preattached leadwire cables).
9.53	14.61	4.57		4.57		100 + 0.0%	
MATRIX SIZE	0.67L x 0	.27W 17.0L		x 6.9W	CEA-XX-375UW-120 CEA-XX-375UW-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$	
500AE					Large gage with very h pattern but higher resist	igh power-dissipation ance.	welle P
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI) H	OVERALL WIDTH	ED-DY-500AE-10C WA-XX-500AE-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	E, L*, LE* W*
0.500	0.850	0.500		0.500	WK-XX-500AE-10C EP-08-500AE-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.15\% \end{array}$	W*
12.70	21.59	12.70		12.70	SA-XX-500AE-350 SK-XX-500AE-10C	$350 \pm 0.3\%$ 1000 ± 0.3% 1000 ± 0.6%	
MATRIX SIZE	0.95L x 0.	60W	24.1L	x 15.2W	WD-DY-500AE-10C	1000 ± 0.6%	
500AF					Large gage with very h 500AE pattern.	igh power-dissipatio	n capability. See also
GAGE		GRID		OVERALL	EA-XX-500AF-120 ED-DY-500AF-350 WA-XX-500AF-120	$120 \pm 0.15\%$ $350 \pm 0.3\%$ $120 \pm 0.3\%$	W, E, L, LE, P E, L*, LE* W*
LENGIN			•			$120 \pm 0.0\%$	\\/*

WK-XX-500AF-350 $350 \pm 0.3\%$ ٧V 0.500 0.830 0.500 0.500 EP-08-500AF-120 $120 \pm 0.15\%$ SA-XX-500AF-120 $120\ \pm\ 0.3\%$ 12.70 21.08 12.70 12.70 SK-XX-500AF-350 $350\ \pm\ 0.3\%$ SD-DY-500AF-350 $350\,\pm\,0.6\%$ MATRIX SIZE 0.98L x 0.58W 24.9L x 14.7W WD-DY-500AF-350 $350 \pm 0.6\%$

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	al size shown. Irged when neces	sary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	en CP = = Sec 1) M = I	Complete pattern Matrix	n inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
500BC		•••••		Special-resistance ver	sion of the 500BH pa	attern.
				EA-XX-500BC-200	200 + 0 15%	WELLEP
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-500BC-600 WA-XX-500BC-200	$\begin{array}{c} 200 \pm 0.13\% \\ 600 \pm 0.3\% \\ 200 \pm 0.3\% \end{array}$	W, L, L, LL, T E, L*, LE* W*
0.500	0.710	0.175	0.175	WK-XX-500BC-600 EP-08-500BC-200	$\begin{array}{c} 600 \pm 0.3\% \\ 200 \pm 0.15\% \end{array}$	W*
12.70	18.03	4.45	4.45	SA-XX-500BC-200 SK-XX-500BC-600	$200 \pm 0.3\%$ $600 \pm 0.3\%$	
MATRIX SIZE	0.77L x 0	.23W 1	9.6L x 5.8W	WD-DY-500BC-600	$600 \pm 0.6\%$ $600 \pm 0.6\%$	
500BH		Î.		Widely used general-pu 500BL and 500UW pat	urpose gage with co terns.	mpact geometry. See also
GAGE	OVERALL		OVERALL	EA-XX-500BH-120	120 ± 0.15%	W, E, L, LE, P
LENGTH	LENGTH	WIDTH	WIDTH	WA-XX-500BH-120 WK-XX-500BH-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.3\%$	E, L, LE W* W*
0.500	0.720	0.175	0.175	EP-08-500BH-120 SA-XX-500BH-120	$120\pm0.15\%$ $120\pm0.3\%$	•••
12.70	18.29	4.45	4.45	SK-XX-500BH-350 SD-DY-500BH-350	$350 \pm 0.3\%$ $350 \pm 0.6\%$	
MATRIX SIZE	0.92L x 0	.30W 2	3.4L x 7.6W	WD-DY-500BH-350	350 ± 0.6%	
500BL).		General-purpose gage. resistance. See also 5	Similar to 500BH p 00UW pattern.	pattern except for
				EA-XX-500BL-350	350 + 0.15%	W. E. L. LE. P
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-500BL-10C WA-XX-500BL-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	E, L*, LE* W*
0.500	0.720	0.175	0.175	WK-XX-500BL-10C EP-08-500BL-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.15\% \\ 0.000 \end{array}$	W*
12.70	18.29	4.45	4.45	SA-XX-500BL-350 SK-XX-500BL-10C	$350 \pm 0.3\%$ 1000 ± 0.3% 1000 ± 0.6%	
MATRIX SIZE	0.87L x 0	.27W 2	2.1L x 6.9W	WD-DY-500BL-10C	1000 ± 0.6%	



General Purpose Strain Gages - Linear Patterns

GAGE PAT	TERN Actu	al size shown. rged when necess	ary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = N	Complete pattern Matrix	n inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
500BV	Ŵ	.		Special-resistance varia	ation of the 500BH p	pattern.
				EA-XX-500BV-100	100 + 0 15%	WELLED
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-500BV-300 WA-XX-500BV-100	300 ± 0.3% 100 ± 0.3%	W, L, L, LL, T E, L*, LE* W*
0.500	0.720	0.175	0.175	WK-XX-500BV-300 EP-08-500BV-100	300 ± 0.3% 100 ± 0.15%	W*
12.70	18.29	4.45	4.45	SA-XX-500BV-100 SK-XX-500BV-300 SD-DY-500BV-300	$100 \pm 0.3\%$ $300 \pm 0.3\%$ $300 \pm 0.6\%$	
MATRIX SIZE	0.82L x 0.	27W 20	0.8L x 6.9W	WD-DY-500BV-300	300 ± 0.6%	
500GA		ć		Very narrow gage. Var obtain 120-ohm resista	iation of the 500GB nce in SK and WK S	pattern, used primarily to series.
	ļ					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	SK XX 500C & 100	100 0.000	
0.500	0.600	0.016	0.060	WK-XX-500GA-120 WK-XX-500GA-120	$120 \pm 0.3\%$ $120 \pm 0.3\%$ $120 \pm 0.3\%$	W* E * E*
12.70	15.24	0.41	1.52	SD-DY-500GA-120 WD-DY-500GA-120	$120 \pm 0.3\%$ $120 \pm 0.3\%$ $120 \pm 0.3\%$	L, L , LL
MATRIX SIZE	0.73L x 0.	15W 18	3.5L x 3.8W	EA-XX-500GA-040	40 ± 0.15%	
500GB	ай :	ŗ		General-purpose gage and 500GC patterns.	with very narrow ge	ometry. See also 500GA
	- - 			E4-XX-500GB-120	120 + 0 15%	W* E L LE P
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-500GB-350 WA-XX-500GB-120	350 ± 0.3% 120 ± 0.3%	W*, E, L*, LE* W*
0.500	0.620	0.060	0.060	WK-XX-500GB-350 EP-08-500GB-120	350 ± 0.3% 120 ± 0.15%	W*
12.70	15.75	1.52	1.52	SA-XX-500GB-120 SK-XX-500GB-350	$\begin{array}{c c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \\ 350 \pm 0.6\% \end{array}$	
MATRIX SIZE	0.75L x 0	.15W 19	9.1L x 3.8W	WD-DY-500GB-350	$350 \pm 0.6\%$ $350 \pm 0.6\%$	

Linear Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Linear Patterns

GAGE PAT ES = Each section	TERN Actu Enla	ial size shown. Irged when necessa Complete pattern	ry for definition.	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W. E. SE. LE.	OPTIONS AVAILABLE
S = Section (S1	= Sec 1) M =	Matrix	millimeter	marked XX.	or P is specified.	
					•	
500GC				General-purpose gage 500GB pattern except	with very narrow ge for resistance.	cometry. Similar to the
	-			EA-XX-500GC-350	350 ± 0.15%	W*, E, L, LE, P
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	ED-DY-500GC-10C WA-XX-500GC-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.3\% \end{array}$	W*, E, L*, LE* W*
0.500	0.620	0.060	0.060	WK-XX-500GC-10C EP-08-500GC-350	$\begin{array}{c} 1000 \pm 0.3\% \\ 350 \pm 0.15\% \\ 350 \pm 0.2\% \end{array}$	W*
12.70	15.75	1.52	1.52	SK-XX-500GC-350 SK-XX-500GC-10C SD-DY-500GC-10C	$1000 \pm 0.3\%$ $1000 \pm 0.6\%$	
MATRIX SIZE	0.78L x (0.15W 19	8L x 3.8W	WD-DY-500GC-10C	1000 ± 0.6%	
500UW	Ţ	'C' F	EATURE	General-purpose gage (2.5 x 1.8mm).	. Exposed solder ta	b area 0.10 x 0.07 in
						CEA-Series Strain Gages feature large copper
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			encapsulated grid.
0.500	0.700	0.180	0.180			(preattached leadwire cables).
12.70	17.78	4.57	4.57	CEA-XX-500UW-120	120 ± 0.3%	
MATRIX SIZE	0.80L x 0	.27W 20	.3L x 6.9W	CEA-XX-500UW-350	350 ± 0.3%	



General Purpose Strain Gages - Tee Rosettes

FEATURES

- · Gage patterns designed for measuring orthogonal strains
- All patterns have two grids orientated at 0° and 90° angles
- · Both stacked and planar constructions available
- Gage lengths from 0.062 in (1.57mm) to 0.500 in (12.7mm)

GAGE PAT ES = Each section S = Section (S1)	TERN Actu Enla n CP = = Sec 1) M =	al size shown. Irged when necessa Complete pattern Matrix	ary for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
030TU				Miniature 90° tee roset	te. Sections are elec	trically independent.
1X	OVERALL	¹ 99999000 ² 4X	OVERAL			
LENGTH	LENGTH	WIDTH	WIDTH			
0.030 ES	0.110 CP	0.044 ES	0.148 CP		120 ± 0.4%	
0.76 ES	2.79 CP	1.12 ES	3.76 CP	EP-08-030TU-120	$120 \pm 0.4\%$ $120 \pm 0.4\%$ $120 \pm 0.8\%$	E , L , LE
MATRIX SIZE	0.25L x (0.25W 6.	4L x 6.4W	SK-XX-030TU-350	$120 \pm 0.8\%$ $350 \pm 0.8\%$	
030TY				Miniature 90° tee roset	te with large solder t	tabs.

	1X		2X				
	GAGE LENGTH	OVERALL LENGTH	GRID WIDT) H	OVERALL WIDTH		
	0.030 ES	0.190 CP	0.044	ES	0.060 CP		100 1 0 10/
	0.76 ES	4.83 CP	1.12 E	S	1.52 CP	EA-XX-030TY-120 EP-08-030TY-120 SA-XX-030TY-120	$120 \pm 0.4\%$ 120 ± 0.4% 120 ± 0.8%
ſ	MATRIX SIZE	0.30L x (0.15W	7.6	6L x 3.8W	SK-XX-030TY-350	350 ± 0.8%

Tee Rosettes

Vishay Micro-Measurements



General Purpose Strain Gages - Tee Rosettes

GAGE PAT	TERN Actu	ial size shown. arged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
030WT				Miniature two-element pattern.	90° tee stacked rose	ette. See also 032WT
1X	1	2X	1			
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.030 ES	0.17 M	0.030 ES	0.19 M			
0.76 ES	4.3 M	0.76 ES	4.8 M	WA-XX-030W1-120 WK-XX-030WT-120 SA-XX-030WT-120	$120 \pm 0.8\%$ $120 \pm 0.8\%$ $120 \pm 0.8\%$	
MATRIX SIZE	0.17L x (0.19W 4.3	3L x 4.8W	SK-XX-030WT-120	120 ± 0.0%	
032WT	:	°C'	FEATURE	Miniature two-element 0.07 x 0.04 in (1.8 x 1. (+65°C).	90° stacked rosette 0 mm). Maximum op	. Exposed solder tab area is perating temperature +150°F
1X GAGE LENGTH	OVERALL LENGTH	2X GRID WIDTH	OVERALL WIDTH			CEA-Series Strain Gages feature large copper solder tabs and a completely
0.032 ES	0.215 CP	0.060 ES	0.215 CP			encapsulated grid.
0.81 ES	5.46 CP	1.52 ES	5.46 CP			
MATRIX SIZE	0.30L x	0.30W 7.6	6L x 7.6W	CEA-XX-032WT-120	120 ± 0.5%	
044TP				Miniature high-resistan	ce 90° tee rosette.	
	-	ب ک با				
1X		4X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.044 ES	0.098 CP	0.044 ES	0.158 CP			
1.12 ES	2.49 CP	1.12 ES	4.01 CP			
MATRIX SIZE	0.14L x	0.20W 3.6	6L x 5.1W	SA-XX-044TP-350 SA-XX-044TP-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$	



General Purpose Strain Gages - Tee Rosettes

GAGE PAT	TERN Actu	ial size show arged when n	n. ecessar	y for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	n CP = = Sec 1) M =	Complete p Matrix	attern	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
050TG		, 1-1-1	-		Miniature high-resistand solder tab.	ce 90° tee rosette. S	ections have a common
1X		2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	, -	OVERALL WIDTH			
0.050 ES	0.250 CP	0.070 E	S	0.070 CP			
1.27 ES	6.35 CP	1.78 E	S	1.78 CP	EA-XX-050TG-350 WA-XX-050TG-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$	L, LE
MATRIX SIZE	0.34L x	0.17W	8.6	L x 4.3W	SA-XX-050TG-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$	
060WT					Small two-element 90°	tee stacked rosette.	See also 062WT pattern.
1X	(2X	† '				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	- -	OVERALL WIDTH	WA-XX-060WT-120 WK-XX-060WT-120	$120 \pm 0.5\%$ $120 \pm 0.5\%$	
0.060 ES	0.24 M	0.060 E	ES	0.30 M	WK-XX-060WT-350 WK-XX-060WT-10C	$350 \pm 0.5\%$ 1000 ± 0.5% 120 ± 0.5%	
1.52 ES	6.1 M	1.52 E	S	7.6 M	SA-XX-060WT-120 SK-XX-060WT-120 SK-XX-060WT-350	$120 \pm 0.5\%$ $120 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.24L x	0.30W	6.1	L x 7.6W	SK-XX-060WT-10C	$1000 \pm 0.5\%$	
062TJ					General-purpose 90° te	ee rosette. Sections	have a common solder tab.
	<u> </u>		2				
1	Х	2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI) -	OVERALL WIDTH			
0.062 ES	0.295 CP	0.080 I	ES	0.080 CP		100 + 0.000	
1.57 ES	7.49 CP	2.03 E	S	2.03 CP	EA-XX-062TJ-120 EA-XX-062TJ-350 SA-XX-062TJ-120	$120 \pm 0.2\%$ $350 \pm 0.2\%$ $120 \pm 0.4\%$	
MATRIX SIZE	0.38L x (0.19W	12.2	2L x 4.8W	SA-XX-062TJ-120 120 ± 0.4% SA-XX-062TJ-350 350 ± 0.4%		

Tee Rosettes

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General Purpose Strain Gages - Tee Rosettes

GAGE PAT ES = Each section S = Section (S1	TERN Actu Enla n CP = = Sec 1) M = I	ial size shown. arged when necessa Complete pattern Matrix	ry for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062TT				General-purpose 90° to See also 062TZ and 06 duplex copper pads (D	ee rosette. Sections 22UT patterns. EK-S P) when optional fea	are electrically independent. eries gages are supplied with ture W or SE is not specified.
1X 2		2X		EA-XX-062TT-120 EA-XX-062TT-350 EK-XX-062TT-350	$120 \pm 0.2\%$ $350 \pm 0.2\%$ $350 \pm 0.2\%$	W, E, L, LE W, E, L, LE W. SE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-062TT-120 WA-XX-062TT-350	$\begin{array}{c} 120 \pm 0.12\% \\ 120 \pm 0.4\% \\ 350 \pm 0.4\% \end{array}$	W* W*
0.062 ES	0.133 CP	0.075 ES	0.168 CP	WK-XX-062TT-350 EP-08-062TT-120	$350 \pm 0.4\%$ $120 \pm 0.2\%$	W*
1.57 ES	3.38 CP	1.91 ES	4.27 CP	SA-XX-062TT-120 SA-XX-062TT-350	$350 \pm 0.2\%$ 120 ± 0.4% 350 ± 0.4%	
MATRIX SIZE	0.28L x (0.26W 7.1	IL x 6.6W	SK-XX-062TT-350	$350 \pm 0.4\%$	
062TZ				General-purpose 90° to except common tab ve	ee rosette. Similar in rsion.	n geometry to 062TT pattern
1	x	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	_		
0.062 ES	0.133 CP	0.075 ES	0.168 CP	EA-XX-062TZ-350	350 ± 0.2%	W, E, L, LE
1.57 ES	3.38 CP	1.91 ES	4.27 CP	WK-XX-062TZ-350 WK-XX-062TZ-120 SA-XX-062TZ-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$ $350 \pm 0.4\%$	
MATRIX SIZE	0.28L x (0.26W 7.1	IL x 6.6W	SK-XX-062TZ-120	120 ± 0.4%	
062UT		[،] (C)	FEATURE	Small general-purpose area 0.07 x 0.04 in [1.8	e two-element 90° teo 3 x 1.0 mm].	e rosette. Exposed solder tab
1						
	IX	2X				CEA-Series Strain Gages feature large copper
GAGE	OVERALL	GRID WIDTH		-		solder tabs and a completely encapsulated grid.
LENGTH LENGTH WIDTH WIDTH 0.062 ES 0.205 CP 0.080 ES 0.225 CP		-		Available with Option P2 (preattached leadwire cables).		
1.57 ES	5.21 CP	2.03 ES	5.72 CP			
MATRIX SIZE	0.31L x	0.31W 7.9	9L x 7.9W	CEA-XX-062UT-120 CEA-XX-062UT-350	$\begin{array}{c} 120 \pm 0.4\% \\ 350 \pm 0.4\% \end{array}$	



General Purpose Strain Gages - Tee Rosettes

GAGE PAT ES = Each section S = Section (S1)	TERN Actu Enla n CP =	ial size show arged when n Complete p Matrix	n. ecessar attern	y for definition.	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE,	OPTIONS AVAILABLE
0 = 0000011 (011	- 000 1) 11 - 1			miniteter	marked XX.	or P is specified.	
062WT	-	Ì	'C' F	EATURE	Small two-element 90° 0.04 in (1.8 x 1.0 mr (+65°C).	stacked rosette. Exp n). Maximum oper	posed solder tab area 0.07 x ating temperature +150°F
1X	OVERALL	2X		OVERALL			CEA-Series Strain Gages
LENGTH	LENGTH	WIDTI	H	WIDTH			solder tabs and a completely
0.062 ES	0.235 CP	0.120 E	S	0.235 CP			encapsulated grid.
1.57 ES	5.97 CP	3.05 E	S	5.97 CP	CE4-XX-062W/T-120	120 + 0.5%	
MATRIX SIZE	0.33L x ().33W	8.3	L x 8.3W	CEA-XX-062WT-350	$350 \pm 0.5\%$	
100TG					Small high-resistance 9	90° tee rosette for ge	eneral-purpose use. See also

					100VA pattern.	-	
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.100 ES	0.400 CP	0.116	ES	0.116 CP			
2.54 ES	10.16 CP	2.95 I	ES	2.95 CP	EA-XX-100TG-350	350 ± 0.2% 350 ± 0.4%	
MATRIX SIZE	E 0.50L x 0.19W 12.7L x 4.8W			7L x 4.8W	SK-XX-100TG-10C	$1000 \pm 0.4\%$	

100VA					Small high-resistance sections are electrically	90° tee rosette. Sim / independent.	ilar to 100TG pattern except
		2 2 2					
GAGE LENGTH	OVERALL LENGTH	GRID WIDT) H	OVERALL WIDTH			
0.100 ES	0.400 CP	0.120	ES	0.120 CP			
2.54 ES	10.16 CP	3.05 E	S	3.05 CP	EA-XX-100VA-350 SA-XX-100VA-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$	
MATRIX SIZE	0.57L x	0.23W	14.5	5L x 5.8W	SK-XX-100VA-10C	1000 ± 0.4%	

Tee Rosettes

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General Purpose Strain Gages - Tee Rosettes

GAGE PAT	TERN Actu Enla	al size show Irged when r	/n. necessar	y for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is		
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete p Vatrix	oattern	inch millimeter	Insert desired S-T-C number in spaces marked XX.	Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE	
						•		
120WT]			Two-element 90° tee s	tacked rosette. See	also 125WT pattern.	
					WA-XX-120WT-120	120 ± 0.5%		
GAGE LENGTH	OVERALL LENGTH	GRIE WIDT	D H	OVERALL WIDTH	WA-XX-120WT-350 WD-DY-120WT-350 WK-XX-120WT-120	$\begin{array}{c} 350 \pm 0.5\% \\ 350 \pm 0.5\% \\ 120 \pm 0.5\% \end{array}$		
0.120 ES	0.34 M	0.080	ES	0.40 M	WK-XX-120WT-350 SA-XX-120WT-120	350 ± 0.5% 120 ± 0.5%		
3.05 ES	8.6 M	2.03	ES	10.1 M	SA-XX-120WT-350 SK-XX-120WT-120 SK-XX-120WT-350	$350 \pm 0.5\%$ $120 \pm 0.5\%$ $350 \pm 0.5\%$		
MATRIX SIZE	0.34L x	0.40W	8.6	L x 10.2W	SD-DY-120WT-350	$350 \pm 0.5\%$ $350 \pm 0.5\%$		
125TA					General-purpose two-e electrical connection. S	element 90° tee rose See also 125TB patte	tte. Sections have a common ern.	
GAGE	OVERALL	GRI)	OVERALL				
LENGTH	LENGTH	WIDT	H	WIDTH				
0.125 ES	0.210 CP	0.150	ES	0.330 CP	EA-XX-125TA-120 WA-XX-125TA-120	120 ± 0.2% 120 ± 0.4%	W, E, L, LE W*	
3.18 ES	5.33 CP	3.81 E	ES	8.38 CP	WK-XX-125TA-350 350 ± 0.4% W* SA-XX-125TA-120 120 ± 0.4%	W*		
MATRIX SIZE	0.36L x (0.41W	9.11	L x 10.4W	SK-XX-125TA-350 350 ± 0.4%			
125 TB	Ē				General-purpose two-e but with higher resistar EK-Series gages are optional feature W or S	element 90° tee rose nce. Sections have c supplied with dup SE is not specified.	tte. Same geometry as 125TA common electrical connection. lex copper dots (DD) when	
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH				
0.125 ES	0.213 CP	0.150	ES	0.340 CP	EA-XX-125TB-350 CP EK-XX-125TB-10C WA-XX-125TB-350 P WK-XX-125TB-350 CA-XX-125TB-350 P VX-125TB-350 CA-XX-125TB-350	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	W, E, L, LE W, SE W*	
3.18 ES	5.41 CP	3.81	ES	8.64 CP			W*	
MATRIX SIZE	0.36L x	0.44W	9.1	L x 11.2W	SK-XX-125TB-10C	1000 ± 0.4%		



General Purpose Strain Gages - Tee Rosettes

GAGE PAT	TERN Actu Enla	al size show	vn. necessar	y for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = I	Complete p Matrix	oattern	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125TF					General-purpose two- geometry. Sections ha 125TG pattern.	element 90° tee r we a common elec	osette with narrow pattern trical connection. See also
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH			
0.125 ES	0.500 CP	0.150	ES	0.150 CP			
3.18 ES	12.70 CP	3.81	ES	3.81 CP	EA-XX-125TF-120 SA-XX-125TE-120	120 ± 0.2% 120 ± 0.4%	L, LE
MATRIX SIZE	0.59L x 0).21W	15.0	DL x 5.3W	SK-XX-125TF-350	$350 \pm 0.4\%$	
125TG	È				General-purpose two-el Sections have a comm 125VA patterns. EK-Se (DD) when optional feat	lement 90° tee rose non electrical conne ries gages are supp ture SE is not specif	tte with high-resistance grid. ection. See also 125TF and lied with duplex copper dots ied.
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH			
0.125 ES	0.500 CP	0.150	ES	0.150 CP	EA-XX-125TG-350	350 ± 0.2%	L, LE
3.18 ES	12.70 CP	3.81	ES	3.81 CP	WA-XX-125TG-350	$350 \pm 0.2\%$	0L

125TM					General-purpose two-e independent. See also	lement 90° tee roset 125TQ and 125UT p	tte. Sections are electrically patterns.
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.125 ES	0.215 CP	0.150	ES	0.335 CP	EA-XX-125TM-120 WA-XX-125TM-120	$\begin{array}{c} 120 \pm 0.2\% \\ 120 \pm 0.4\% \end{array}$	W, E, L, LE *W
3.18 ES 5.46 CP 3.81 ES 8.51 CP				8.51 CP	EP-08-125TM-120	$350 \pm 0.4\%$ 120 ± 0.2% 120 ± 0.4%	VV
MATRIX SIZE	SIZE 0.36L x 0.43W 9.1L x 10.9W			SK-XX-125TM-350	350 ± 0.4%		

SA-XX-125TG-350

SK-XX-125TG-10C

 $350\,\pm\,0.4\%$

 $1000\,\pm\,0.4\%$

*Options available but not normally recommended. See Optional Features datasheet for details.

15.0L x 5.3W

MATRIX SIZE

0.59L x 0.21W

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General Purpose Strain Gages - Tee Rosettes

GAGE PAT	TERN Actu	ial size shown. Irged when necessar	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	on CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	number in spaces marked XX.	Option W, E, SE, LE, or P is specified.	OP HONS AVAILABLE
125 TQ		<u>4</u>		General-purpose two-e except for resistance. supplied with duplex co not specified.	element 90° tee rose See also 125UT p opper dots (DD) whe	tte. Similar to 125TM pattern attern. EK-Series gages are n optional feature W or SE is
	; 	;				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-125TQ-350	350 ± 0.2%	W, E, L, LE
0.125 ES	0.215 CP	0.150 ES	0.335 CP	EK-XX-125TQ-10C WA-XX-125TQ-350	$\begin{array}{c} 1000 \pm 0.2\% \\ 350 \pm 0.4\% \\ 1000 \pm 0.4\% \end{array}$	W, SE W*
3.18 ES	5.46 CP	3.81 ES	8.51 CP	EP-08-125TQ-350 SA-XX-125TQ-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$	VV
MATRIX SIZE	0.42L x	0.47W 10.7	7L x 11.9W	SK-XX-125TQ-10C	1000 ± 0.4%	
125VA				General-purpose two Similar to 125TG pat See also 125VB patte	-element 90° tee ros ttern except sections ern.	sette with high-resistance grid. s are electrically independent.
	:					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.500 CP	0.150 ES	0.150 CP	FA-XX-125VA-350	350 + 0.2%	
3.18 ES	12.70 CP	3.81 ES	3.81 CP	EP-08-125VA-350 SA-XX-125VA-350	$350 \pm 0.2\%$ $350 \pm 0.2\%$ $350 \pm 0.4\%$	
MATRIX SIZE	0.64L x	0.23W 16.	3L x 5.8W	SK-XX-125VA-10C	1000 ± 0.4%	
125VB	È			General-purpose two-e except sections are ele	element 90° tee rose ectrically independer	ette. Similar to 125TF pattern It. See also 125VA pattern.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.500 CP	0.150 ES	0.150 CP		120 + 0.00%	
3.18 ES	12.70 CP	3.81 ES	3.81 CP	EP-08-125VB-120 SA-XX-125VB-120	$120 \pm 0.2\%$ 120 ± 0.2% 120 ± 0.4%	
MATRIX SIZE	0.64L x	0.23W 16.	3L x 5.8W	SK-XX-125VB-350	350 ± 0.4%	



General Purpose Strain Gages - Tee Rosettes

GAGE PAT	TERN Actu	ial size shown. Irged when necessai	y for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125UT		(C,	FEATURE	Two-element 90° tee ro area 0.10 x 0.07 in (2.5	sette for general-pur x 1.8 mm).	pose use. Exposed solder tab
						CEA-Series Strain Gages feature large copper solder tabs and a completely
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			encapsulated grid.
0.125 ES	0.325 CP	0.165 ES	0.365 CP			(preattached leadwire cables).
3.18 ES	8.26 CP	4.19 ES	9.27 CP		120 + 0.4%	
MATRIX SIZE	0.42L x	0.45W 10.7	7L x 11.4W	CEA-XX-125UT-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	
125WT		(C' I	EATURE	Two-element 90° tee s 0.07 in (2.5 x 1.8 mm). I	tacked rosette. Exp Maximum operating t	osed solder tab area 0.10 x temperature +150°F (+65°C).
0405			OVERALL			CEA-Series Strain Gages
LENGTH	LENGTH	WIDTH	WIDTH			encapsulated grid.
0.125 ES	0.325 CP	0.180 ES	0.325 CP			
3.18 ES	8.2 CP	4.57 ES	8.26 CP	CEA-XX-125WT-120	120 ± 0.5%	
MATRIX SIZE	0.42L x ().42W 10.7	L x 10.7W	CEA-XX-125WT-350	350 ± 0.5%	
250NA	Miter	* Illban		Stress gage. Electrical angle is 57°, correspon	lly balanced for higl ding to Poisson's rat	hest accuracy. The included tio of 0.295.
	-					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250 ES	0.306 CP	0.093 ES	0.493 CP	EA-XX-250NA-120	120 ± 0.2%	L, LE
6.35 ES	7.77 CP	2.36 ES	12.52 CP	WA-XX-250NA-120 WK-XX-250NA-350	$\begin{array}{c} 120 \pm 0.4\% \\ 350 \pm 0.4\% \\ 120 \pm 0.4\% \end{array}$	
MATRIX SIZE	0.40L x (0.59W 10.2	L x 15.0W	SK-XX-250NA-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	

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GAGE PAT ES = Each section	TERN Actu Enla	al size shown. rged when necessa Complete pattern	ry for definition.	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE,	OPTIONS AVAILABLE
5 = Section (51:	= Sec I) IVI = I	viatrix	millimeter	marked XX.	or P is specified.	
250TA				General-purpose two-e electrical connection. S	element 90° tee rose See also 250TB patte	tte. Sections have a common ern.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250 ES	0.425 CP	0.300 ES	0.680 CP	EA-XX-250TA-120	120 ± 0.2%	W, E, L, LE
6.35 ES	10.80 CP	7.62 ES	17.27 CP	WA-XX-250TA-120 WK-XX-250TA-350 SA-XX-250TA-120	$120 \pm 0.4\%$ $350 \pm 0.4\%$ $120 \pm 0.4\%$	W*
MATRIX SIZE	0.63L x	0.81W 16.	0L x 20.6W	SK-XX-250TA-350	$350 \pm 0.4\%$	
250 TB				General-purpose two-e 250TA pattern. EK-Ser (DP) when optional fea	lement 90° tee roset ies gages are suppl ture W or SE is not s	te. High-resistance version of ied with duplex copper pads specified.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250 ES	0.425 CP	0.300 ES	0.680 CP	EA-XX-250TB-350 EK-XX-250TB-10C	$350 \pm 0.2\%$ $1000 \pm 0.2\%$	W, E, L, LE W, SE
6.35 ES	10.80 CP	7.62 ES	17.27 CP	WA-XX-250TB-350 WK-XX-250TB-10C	$350 \pm 0.4\%$ 1000 ± 0.4% 250 ± 0.4%	W* W*
MATRIX SIZE	0.63L x 0).81W 16.0)L x 20.6W	SK-XX-250TB-10C	$1000 \pm 0.4\%$	
250TF				General-purpose two- geometry. Sections ha 250VB and 250TG path	element 90° tee r ave a common elec erns.	osette with narrow pattern trical connection. See also
		·				
	HORIZONTA	L POSITION				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250 ES	1.000 CP	0.290 ES	0.290 CP			
6.35 ES	25.40 CP	7.37 ES	7.37 CP	EA-XX-250TF-120	120 ± 0.2% 120 ± 0.4%	L, LE
MATRIX SIZE	1.17L x ().40W 29.7	′L x 10.2W	SK-XX-250TF-350	350 ± 0.4%	

ble but not normally recommended. See C sheet for details.



General Purpose Strain Gages - Tee Rosettes

GAGE PAT	TERN Actu	ial size show irged when r	n. Necessar	y for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = I	Complete p Matrix	attern	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250TG	ے۔ میں شاہر				General-purpose two-e the 250TF pattern.	lement 90° tee roset	te. High-resistance version of
	HORIZONTA	L POSITIO	N				
GAGE LENGTH	OVERALL LENGTH	GRIE WIDT) H	OVERALL WIDTH			
0.250 ES	1.000 CP	0.290	ES	0.290 CP			
6.35 ES	25.40 CP	7.37 8	ES	7.37 CP	EA-XX-250TG-350 SA-XX-250TG-350	350 ± 0.2% 350 ± 0.4%	L, LE
MATRIX SIZE	1.17L x (0.40W	29.7	'L x 10.2W	SK-XX-250TG-10C	1000 ± 0.4%	
250TM					General-purpose two-el independent. See also 2	lement 90° tee rose 50UT pattern.	tte. Sections are electrically
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.250 ES	0.430 CP	0.300	ES	0.670 CP	EA-XX-250TM-120 WA-XX-250TM-120	120 ± 0.2% 120 ± 0.4%	W, E, L, LE W*
6.35 ES	10.92 CP	7.62 E	S	17.02 CP	WK-XX-250TM-350 EP-08-250TM-120	350 ± 0.4% 120 ± 0.2%	W*
MATRIX SIZE	0.53L x ().75W	13.5	L x 19.1W	SA-XX-250TM-120 SK-XX-250TM-350	$120 \pm 0.4\%$ 350 ± 0.4%	
250VA		1 .			General-purpose two-e the 250VB pattern.	element 90° tee rose	tte. High-resistance version of
	HORIZONTAL	POSITION					
GAGE LENGTH	OVERALL GRID OVERALL LENGTH WIDTH WIDTH			OVERALL WIDTH			
0.250 ES	1.000 CP	0.300	ES	0.300 CP			
6.35 ES	25.40 CP	7.62	ES	7.62 CP	EA-XX-250VA-350 EP-08-250VA-350 SA-XX-250VA-350	$350 \pm 0.2\%$ $350 \pm 0.2\%$ $350 \pm 0.4\%$	
MATRIX SIZE	1.16L x (0.42W	29.5	5L x 10.7W	SK-XX-250VA-10C	1000 ± 0.4%	

Tee Rosettes

Vishay Micro-Measurements



General Purpose Strain Gages - Tee Rosettes

GAGE PAT ES = Each section S = Section (S1	TERN Actu Enlation CP = = Sec 1) M =	al size shown. arged when necessa Complete pattern Matrix	ry for definition inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250VB				General-purpose two- pattern except section and 250VA patterns.	element 90° tee ro is are electrically in	osette. Similar to the 250TF dependent. See also 250TG
	HORIZONTAL	POSITION				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	-		
0.250 ES	1.000 CP	0.300 ES	0.300 CP			
6.35 ES	25.40 CP	7.62 ES	7.62 CP	EA-XX-250VB-120 EP-08-250VB-120	$120 \pm 0.2\%$ $120 \pm 0.2\%$ $120 \pm 0.4\%$	
MATRIX SIZE	1.16L x ().42W 29.5	5L x 10.7W	SK-XX-250VB-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	
250UT		'C'	FEATURE	Two-element 90° tee ro area 0.13 x 0.10 in (3.3	osette for general-pur x 2.5 mm).	pose use. Exposed solder tab
	ţ,					CEA-Series Strain Gages feature large copper solder tabs and a completely
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	_		Available with Option P2
0.250 ES	0.450 CP	0.290 ES	0.650 CP			(preattached leadwire cables).
6.35 ES	11.43 CP	7.37 ES	16.51 CP	CEA-XX-250UT-120 CEA-XX-250UT-350	120 ± 0.4% 350 ± 0.4%	
MATRIX SIZE	0.55L x (0.74W 14.0	DL x 18.8W	CEA-XX-250UT-10C	1000 ± 0.4%	
250WQ	·	'C' F	EATURE	Two-element 90° tee s + 150°F (+65°C). Expose	tacked rosette. Max ed solder tab area is 0.	kimum operating temperature 11 x 0.07 in (2.8 x 1.8 mm).
		N'				CEA-Series Strain Gages
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	1		feature large copper solder tabs and a completely
0.250 ES	0.550 M	0.180 ES	0.550 M	1		encapsulated grid.
6.35 ES	13.97 M	4.57 ES	13.97 M			
MATRIX SIZE	0.55L x	0.55W 14.0)L x 14.0W	CEA-XX-250WQ-350	$350\pm0.3\%$	



General Purpose Strain Gages - Tee Rosettes

GAGE PAT ES = Each section S = Section (S1	TERN Actu Enla on CP = = Sec 1) M = I	al size shown. Irged when necessa Complete pattern Matrix	ry for definition.	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or B is aposified	OPTIONS AVAILABLE
250WT				Two-element 90° tee s	tacked rosette.	
		<		WA-XX-250WT-120 WA-XX-250WT-350	120 ± 0.5% 350 ± 0.5%	
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WD-DY-250WT-350 WK-XX-250WT-120	$\begin{array}{c} 350\ \pm\ 0.5\%\\ 120\ \pm\ 0.5\%\end{array}$	
0.250 ES	0.51 M	0.125 ES	0.60 M	WK-XX-250WT-350 SA-XX-250WT-120	$350 \pm 0.5\%$ $120 \pm 0.5\%$	
6.35 ES	13.0 M	3.18 ES	15.2 M	SK-XX-250WT-350 SK-XX-250WT-120 SK-XX-250WT-350	$350 \pm 0.5\%$ 120 ± 0.5% 350 ± 0.5%	
MATRIX SIZE	0.51L x	0.60W 13.	0L x 15.2W	SD-DY-250WT-350	350 ± 0.5%	
270TN		, J		Two-element 90° tee ro	osette. Sections are	electrically independent.
	- [] -					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.270 0.120 S1 S2	0.450 CP	0.150 0.300 S1 S2	0.330 CP	EA-XX-270TN-350 WA-XX-270TN-350 WK-XX-270TN-10C	$350 \pm 0.2\%$ $350 \pm 0.4\%$ $1000 \pm 0.4\%$	E, L, LE
6.86 3.05 S1 S2	11.43 CP	3.81 7.62 S1 S2	8.38 CP	SA-XX-270TN-350 SK-XX-270TN-10C	$350 \pm 0.4\%$ $1000 \pm 0.4\%$	
MATRIX SIZE	0.53L x 0).38W 13.	5L x 9.7W	WD-DY-270TN-10C	1000 ± 1.0%	
500WT				Two-element 90° tee st	acked rosette.	
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-500WT-120 WA-XX-500WT-350	$\begin{array}{r} 120 \ \pm \ 0.5\% \\ 350 \ \pm \ 0.5\% \end{array}$	
0.500 ES	0.76 M	0.120 ES	0.84 M	WD-DY-500WT-350 WK-XX-500WT-350	$\begin{array}{c c} 350 \pm 0.5\% \\ 350 \pm 0.5\% \\ 120 \pm 0.5\% \end{array}$	
12.70 ES	19.3 M	3.05 ES	21.3 M	SA-XX-500WT-120 SA-XX-500WT-350 SK-XX-500WT-350	$120 \pm 0.5\%$ $350 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.76L x	0.84W 19.3	3L x 21.3W	SD-DY-500WT-350	350 ± 0.5%	

Vishay Micro-Measurements



General Purpose Strain Gages - Rectangular Rosettes

FEATURES

- · Gage patterns designed for determining principle stresses and strains
- All patterns have three grids orientated at $0^\circ,\,45^\circ$ and 90° angles
- · Both stacked and planar constructions available
- Gage lengths from 0.015 in (0.38 mm) to 0.500 in (12.7 mm)

ES = Each section S = Section (S1)	TERN Actu Enla in CP = = Sec 1) M = 1	ial size shown. Irged when neo Complete pat Matrix	cessary for definiti tern inch millimet	m. Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
015RC			·	Micro-miniature three- sections. See also 019 Note: See Strip Patter gages.	element 45° rosette 5RJ pattern. ns datasheet for disc	with one tab common to all sussion of common-tab
1 X	1X 6X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERAL WIDTH	•		
0.015 ES	0.070 CP	0.020 ES	S 0.140 C	,		
0.38 ES	1.78 CP	0.51 ES	3.56 CP	FA-XX-015BC-120	120 + 0.6%	E SE
MATRIX SIZE	0.18L x 0.	23W	4.6L x 5.8W	SA-XX-015RC-120	120 ± 0.0%	

015RJ					Micro-miniature three- except each section ha	element 45° rosette is separate tabs for	e. Similar to 015RC pattern electrical isolation.
			3				
1X 6>		(
GAGE LENGTH	OVERALL LENGTH	GRID WIDT) H	OVERALL WIDTH			
0.015 ES	0.070 CP	0.020	ES	0.140 CP			
0.38 ES	1.78 CP	0.51 E	S	3.56 CP		120 + 0.6%	FSE
MATRIX SIZE	0.19L x 0	.23W	4.8	L x 5.8W	SA-XX-015RJ-120	$120 \pm 0.0\%$ $120 \pm 1.0\%$	



Vishay Micro-Measurements

General Purpose Strain Gages - Rectangular Rosettes

GAGE PATTERN Actua	al size shown. ged when necessa	y for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
$ ES = Each section \qquad CP = C \\ S = Section (S1 = Sec 1) M = M $	Complete pattern Iatrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
030WR		/			
			Miniature three-eleme	ent 45° rectangular s	tacked rosette.
1X	2X				
GAGE OVERALL LENGTH LENGTH	GRID WIDTH	OVERALL WIDTH			
0.030 ES 0.18 M	0.030 ES	0.19 M	WA-XX-030WB-120	120 + 0.8%	
0.76 ES 4.4 M	0.76 ES	4.8 M	WK-XX-030WR-120 SA-XX-030WR-120	$120 \pm 0.8\%$ $120 \pm 0.8\%$ $120 \pm 0.8\%$	
MATRIX SIZE 0.18L x 0.	.19W 4.	4L x 4.8W	SK-XX-030WR-120	120 ± 0.8%	

031RB ₂∕@Ů́					Miniature 45° rectang geometry.	ular single-plane ros	sette with compact
		, b í í		,			
0405		0.01	4X	OVERALL			
LENGTH	LENGTH	WIDT	Э Ή	WIDTH			
0.031 ES	0.085 CP	0.031 E	ΞS	0.175 CP			
0.79 ES	2.16 CP	0.79 E	S	4.45 CP	EA-XX-031RB-120 EP-08-031RB-120	120 ± 0.4% 120 + 0.4%	E, SE, L, LE
MATRIX SIZE	0.19L x (0.24W	.24W 4.8L x 6.1W		SA-XX-031RB-120	120 ± 0.4%	

060WR				Small three-element 4	15° rectangular stac	ked rosette.
1X		2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-060WR-120 WK-XX-060WR-120	120 ± 0.5% 120 ± 0.5%	
0.060 ES	0.24 M	0.060 ES	0.30 M	WK-XX-060WR-350 WK-XX-060WR-10C	$350 \pm 0.5\%$ $1000 \pm 0.5\%$	
1.52 ES	6.1 M	1.52 ES	7.6 M	SA-XX-060WR-120 SK-XX-060WR-120 SK-XX-060WB-350	$120 \pm 0.5\%$ $120 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.24L>	< 0.30W	6.1L x 7.6W	SK-XX-060WR-10C	1000 ± 0.5%	

Vishay Micro-Measurements



General Purpose Strain Gages - Rectangular Rosettes

GAGE PAT	TERN Actu	ial size shown. Irged when necessai	y for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062RB		, A min	<u>م</u>	Small 45° rectangula See also 062RG and	r single-plane rosett I 062UR patterns.	e with compact geometry.
	A		3			
	1X	2X	(
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.062 ES	0.171 CP	0.062 ES	0.300 CP	EA-XX-062RB-120 WA-XX-062RB-120 WK-XX-062RB-350	$120 \pm 0.2\%$ $120 \pm 0.4\%$ $350 \pm 0.4\%$	E, L, LE W* W*
1.57 ES	4.34 CP	1.57 ES	7.62 CP	EP-08-062RB-120 SA-XX-062RB-120	$\begin{array}{c} 120 \pm 0.4\% \\ 120 \pm 0.2\% \\ 120 \pm 0.4\% \end{array}$	
MATRIX SIZE	0.42L x 0	.46W 10	.7L x 11.7W	SK-XX-062RB-350	350 ± 0.4%	
062RF			—	Small 45° rectangul Option W. Similar to 062UR pattern.	ar single-plane ros 062RG pattern exc	ette designed for use with ept for resistance. See also
			3			
	1X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.062 ES	0.154 CP	0.062 ES	0.400 CP			
1.57 ES	3.91 CP	1.57 ES	10.16 CP	EA-XX-062RF-350	350 ± 0.2%	W. E. L. LE
MATRIX SIZE	0.25L x	0.46W 6.4L	x 11.7W	SA-XX-062RF-350	350 ± 0.4%	, , ,
062RG			\	Small 45° rectangula but specifically desig 062UR patterns.	ar single-plane roset ned for use with Op	te. Similar to 062RB pattern tion W. See also 062RF and
		· I ·				
1X		2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.062 ES	0.154 CP	0.062 ES	0.400 CP			
1.57 ES	3.91 CP	1.57 ES	10.16 CP			
MATRIX SIZE	0.27L x	0.48W 6.9	9L x 12.2W	EA-XX-062RG-120	120 ± 0.2%	W



General Purpose Strain Gages - Rectangular Rosettes

GAGE PAT ES = Each sectio	TERN Actu Enla	al size shown. rged when ne Complete pat	cessary for definition. ttern inch	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE,	OPTIONS AVAILABLE
S = Section (S1:	= Sec 1) M = 1	Vatrix	millimeter	marked XX.	or P is specified.	
062UR			'C' FEATURE	Small 45° rectangula Exposed solder tab ar	r single-plane roset ea 0.07 x 0.04 in (1.	te in a compact geometry. 8 x 1.0 mm).
7	1X	1 2 2X				CEA-Series Strain Gages feature large copper solder tabs and a completely
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			encapsulated grid.
0.062 ES	0.222 CP	0.062 E	S 0.420 CP			(preattached leadwire cables).
1.57 ES	5.64 CP	1.57 ES	S 10.67 CP			
MATRIX SIZE	0.32L x 0.4	18W	8.1L x 12.2W	CEA-XX-062UR-120 CEA-XX-062UR-350	$\begin{array}{c} 120 \pm 0.4\% \\ 350 \pm 0.4\% \end{array}$	
120WR				Three-element 45° recta	angular stacked rose	ette.
				WA-XX-120WR-120 WA-XX-120WR-350	$120 \pm 0.5\%$ $350 \pm 0.5\%$	W W
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WD-DY-120WR-350 WK-XX-120WR-120	$350 \pm 0.5\%$ 120 ± 0.5%	W
0.120 ES	0.34 M	0.080 ES	6 0.40 M	SA-XX-120WR-350 SA-XX-120WR-120 SA-XX-120WR-350	$350 \pm 0.5\%$ 120 ± 0.5% 350 ± 0.5%	vv
3.05 ES	8.6 M	2.03 ES	10.2 M	SK-XX-120WR-120 SK-XX-120WR-350	$120 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.34L x (0.40W	8.6L x 10.2W	SD-DY-120WR-350	350 ± 0.5%	
125RA	*			General-purpose thre geometry. See also 12 supplied with duplex co not specified.	e-element 45° rect 5RD and 125UR pa pper pads (DP) whe	tangular rosette. Compact tterns. EK-Series gages are n optional feature W or SE is
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-125RA-120	120 ± 0.2%	W, E, L, LE
0.125 ES	0.275 CP	0.062 ES	0.424 CP	EK-XX-125RA-350 WA-XX-125RA-120	$350 \pm 0.2\%$ $120 \pm 0.4\%$	W, SE W* W*
3.18 ES	6.99 CP	1.57 ES	10.77 CP	VVN-XX-125HA-350 EP-08-125RA-120 SA-XX-125RA-120	350 ± 0.4% 120 ± 0.2% 120 ± 0.4%	vv
MATRIX SIZE	0.39L x	0.46W	9.9L x 11.7W	SK-XX-125RA-350	$350 \pm 0.4\%$	

Vishay Micro-Measurements



General Purpose Strain Gages - Rectangular Rosettes

GAGE PAT	TERN Actu	ial size shown. Irged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1	en CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125RD		\$		General-purpose thre 125RA pattern exce 125UR patterns.	ee-element 45° recta pt for grid resistand	angular rosette. Similar to ce. See also 125RS and
		IÇ.				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.275 CP	0.062 ES	0.424 CP			
3.18 ES	6.99 CP	1.57 ES	10.77 CP	EA-XX-125RD-350 WA-XX-125RD-350	$\begin{array}{c} 350\ \pm\ 0.2\%\\ 350\ \pm\ 0.4\%\end{array}$	E, L, LE
MATRIX SIZE	0.40L x	0.47W 10).1L x 11.9W	SA-XX-125RD-350	350 ± 0.4%	
125RS		`.		Three-element 45° r Similar to 125RD patt W in the EA Series. S	ectangular rosette ern but designed par see also 125UR patte	with high-resistance grid. ticularly for use with Option ern.
			1			
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.245 CP	0.060 ES	0.620 CP			
3.18 ES	6.22 CP	1.52 ES	15.75 CP	EA-XX-125RS-350	350 ± 0.2%	w
MATRIX SIZE	0.34L x ().70W 8	3.6L x 17.8W	WA-XX-125RS-350	350 ± 0.4%	W*
125UR	∕∆ ∰≪	.,C,	FEATURE	General-purpose 45° s Exposed solder tab are	ingle-plane rosette. (a 0.08 x 0.06 in (2.0	Compact geometry. x 1.5 mm).
						CEA-Series Strain Gages
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			solder tabs and a completely encapsulated grid.
0.125 ES	0.300 CP	0.060 ES	0.560 CP			Available with Option P2 (preattached leadwire cables).
3.18 ES	7.62 CP	1.52 ES	14.22 CP	CEA-XX-125UB-120	120 + 0.4%	
MATRIX SIZE	0.42L x	0.62W 10	.7L x 15.7W	CEA-XX-125UR-350	350 ± 0.4%	



Vishay Micro-Measurements

General Purpose Strain Gages - Rectangular Rosettes

GAGE PAT	TERN Actu	al size shown. Irged when necessar	ry for definition.	GAGE DESIGNATION Insert desired S-T-C	RES. IN OHMS Tolerance is increased when	OPTIONS AVAILABLE
ES = Each section S = Section (S1=	n CP = = Sec 1) M = N	Complete pattern Matrix	millimeter	number in spaces marked XX.	Option W, E, SE, LE, or P is specified.	
250RA	×	- M.		Large three-element 4 arrangement. See als	45° rectangular roset o 250RD and 250UF	tte with convenient solder tab R patterns.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250 ES	0.550 CP	0.125 ES	0.847 CP	EA-XX-250RA-120 WA-XX-250RA-120	$120 \pm 0.2\%$ $120 \pm 0.4\%$	W, E, L, LE W*
6.35 ES	13.97 CP	3.18 ES	21.51 CP	EP-08-250RA-120	$350 \pm 0.4\%$ 120 ± 0.2% 120 ± 0.4%	W*
MATRIX SIZE	0.78L x (0.93W 19.	8L x 23.6W	SK-XX-250RA-350	$350 \pm 0.4\%$	
250RD		. .		Large three-element 2 pattern except for resist are supplied with duple SE is not specified.	45° rectangular ros tance. See also 2501 ex copper pads (DP)	ette. Similar to the 250RA JR pattern. EK-Series gages when optional feature W or
		11.				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-250RD-350 EK-XX-250RD-10C	$350 \pm 0.2\%$ $1000 \pm 0.2\%$ $1000 \pm 0.4\%$	W, E, L, LE W, SE
0.250 ES	0.550 CP	0.125 ES	0.847 CP	WA-XX-250RD-350	$1000 \pm 0.4\%$ $350 \pm 0.4\%$ $1000 \pm 0.4\%$	W*
6.35 ES	13.97 CP	3.18 ES	21.51 CP	EP-08-250RD-350 SA-XX-250RD-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$	VV
MATRIX SIZE	0.78L x (0.93W 19.8	L x 23.6W	SK-XX-250RD-10C	1000 ± 0.4%	
250UR		(C' F	EATURE	Large three-element 4 area 0.13 x 0.08 in (3.3	5° single-plane roso x 2.0 mm).	ette. Exposed solder tab
		·				CEA-Series Strain Gages feature large copper
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			solder tabs and a completely encapsulated grid.
0.250 ES	0.500 CP	0.120 ES	0.760 CP			Available with Option P2 (preattached leadwire cables).
6.35 ES	12.70 CP	3.05 ES	19.30 CP	CEA-XX-25011B-120		
MATRIX SIZE	0.65L x (0.80W 16.5	L x 20.3W	CEA-XX-250UR-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	

Vishay Micro-Measurements



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GAGE PAT	TERN Actu	al size shown. rged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1	on CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250WF				Four-element tee-ree rectangular configuration gage.	ctangular stacked on with a fourth grid e	rosette. This is a 45° element at 90° to the center
	/			WA-XX-250WF-120	120 ± 0.5%	
				WA-XX-250WF-350	350 ± 0.5%	
GAGE	OVERALL	GRID		WD-DY-250WF-350	$350 \pm 0.5\%$	
LENGTH	LENGTH	WIDTH	WIDTH	WK-XX-250WF-120 WK-XX-250WF-350	$120 \pm 0.5\%$ $350 \pm 0.5\%$	
0.250 ES	0.51 M	0.125 ES	0.60 M	SA-XX-250WF-120	$120 \pm 0.5\%$	
				SA-XX-250WF-350	350 ± 0.5%	
6.35 ES	13.0 M	3.18 ES	15.2 M	SK-XX-250WF-120	120 ± 0.5%	
	0.541	0.0014		SK-XX-250WF-350	350 ± 0.5%	
MATRIX SIZE	0.51L x	0.60W 13	.0L x 15.2W	SD-DY-250WF-350	$350 \pm 0.5\%$	
250WR		»		Three-element 45° rect	tangular stacked ros	ette.
				WA-XX-250WR-120 WA-XX-250WR-350	120 ± 0.5% 350 ± 0.5%	W* W*
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WD-DY-250WR-350 WK-XX-250WR-120	$350 \pm 0.5\%$ $120 \pm 0.5\%$	W* W*
0.250 ES	0.51 M	0.125 ES	0.60 M	SA-XX-250WR-350 SA-XX-250WR-120 SA-XX-250WR-350	$350 \pm 0.5\%$ 120 ± 0.5% 350 ± 0.5%	VV."
6.35 ES	13.0 M	3.18 ES	15.2 M	SK-XX-250WR-120 SK-XX-250WR-350	$120 \pm 0.5\%$ $350 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.51L x	0.60W 13.	0L x 15.2W	SD-DY-250WR-350	$350\pm0.5\%$	
500WR				Three-element 45° rec	tangular stacked ros	sette.

JUUN		$\langle \rangle$			Three-element 45° rectangular stacked rosette.		
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH	WA-XX-500WR-120 WA-XX-500WR-350	$\begin{array}{l} 120 \ \pm \ 0.5\% \\ 350 \ \pm \ 0.5\% \end{array}$	
0.500 ES	0.76 M	0.120) ES	0.84 M	WD-DY-500WR-350 WK-XX-500WR-350	$350 \pm 0.5\%$ $350 \pm 0.5\%$	
12.70 ES	19.3 M	3.05	ES	21.3 M	SA-XX-500WR-120 SA-XX-500WR-350 SK-XX-500WB-350	$120 \pm 0.5\%$ $350 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.76L x 0.84	W 19.3L x 21.3W			SD-DY-500WR-350	350 ± 0.5%	



General Purpose Strain Gages - Delta Rosettes

FEATURES

- · Gage patterns designed for determining principle stresses and strains
- All patterns have three grids orientated at 0°, 60° and 120° angles
- · Both stacked and planar constructions available
- Gage lengths from 0.015 in (0.38mm) to 0.500 in (12.7mm)

GAGE PATTERN Actual size shown. Enlarged when necessary for definition. ES = Each section CP = Complete pattern S = Section (S1= Sec 1) M = Matrix					GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
015YC				2	Micro-miniature three-e all sections. See also 0 Note: See Strip Pattern	element 60° delta ros 15YD pattern. s datasheet for discu	sette with one tab common to ussion of common-tab gages.
1X		2					
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.015 ES	0.063 CP	0.020 ES		0.140 CP			
0.38 ES	1.60 CP	0.51 l	ES	3.56 CP	EA XX 015XC 120	120 + 0.6%	ESE
MATRIX SIZE	0.15L x 0).18W	3.8	L x 4.6W	SA-XX-015YC-120	120 ± 0.0%	E, 3E

015YD

543	
1X	2 · 3 6X

Micro-miniature three-element 60° delta rosette. Similar to 015YC pattern except each section has separate tabs for electrical isolation.

■# ■ 1X							
GAGE LENGTH	OVERALL LENGTH	GRIE WIDT) H	OVERALL WIDTH	-		
0.015 ES	0.063 CP	0.020	ES	0.140 CP			
0.38 ES	1.60 CP	0.51 E	ES	3.56 CP	E4-XX-015XD-120	120 + 0.6%	E, SE
MATRIX SIZE	0.15L x (0.18W	3.8	L x 4.6W	SA-XX-015YD-120	120 ± 0.0%	

Delta Rosettes

Vishay Micro-Measurements



General Purpose Strain Gages - Delta Rosettes

GAGE PAT	TERN Actu	ial size shown. Irged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1	on CP = = Sec 1) M =	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
030WY				Miniature three-elemer	nt 60° delta stacked i	rosette.
	¥ 1X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	-		
0.030 ES	0.17 M	0.030 ES	0.19 M			
0.76 ES	4.3 M	0.76 ES	4.8 M	WA-XX-030WY-120 WK-XX-030WY-120 SA-XX-030WY-120	120 ± 0.8% 120 ± 0.8% 120 ± 0.8%	
MATRIX SIZE	0.17L x (0.19W 4.3	3L x 4.8W	SK-XX-030WY-120	$120 \pm 0.8\%$	
030YB				Miniature three-elemer	nt 60° delta single-pl	ane rosette.
	54					
	1X	4X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.030 ES	0.104 CP	0.030 ES	0.200 CP			
0.76 ES	2.64 CP	0.76ES	5.08 CP	EA-XX-030YB-120	120 + 0.4%	F SF
MATRIX SIZE	0.21L x (0.27W 5.3	3L x 6.9W	SA-XX-030YB-120	120 ± 0.4%	

060WY					Small three-element 60° delta stacked rosette.		
	1X	2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDT) H	OVERALL WIDTH	WA-XX-060WY-120 WK-XX-060WY-120	120 ± 0.5% 120 ± 0.5%	
0.060 ES	0.24 M	0.060	ES	0.30 M	WK-XX-060WY-350 WK-XX-060WY-10C	$350 \pm 0.5\%$ $1000 \pm 0.5\%$ $120 \pm 0.5\%$	
1.52 ES	6.1 M	1.52 E	ES	7.6 M	SA-XX-060WY-120 SK-XX-060WY-120 SK-XX-060WY-350	$120 \pm 0.5\%$ $120 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.24L x (0.30W	6.1	L x 7.6W	SK-XX-060WY-10C	1000 ± 0.5%	



General Purpose Strain Gages - Delta Rosettes

GAGE PAT	TERN Actu	al size shown. Irged when neo	cessary fo	or definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectio S = Section (S1:	n CP = = Sec 1) M = I	Complete pat Matrix	tern	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062YE			*		Small 60° delta single-p with Option W.	olane rosette. Norma	ally used in the EA Series
1X			5 3 5				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	0	VERALL WIDTH			
0.062 ES	0.150 CP	0.062 ES	s c	0.400 CP			
1.57 ES	3.81 CP	1.57 ES	1	10.16 CP	EA-XX-062YE-350	350 + 0.2%	WE
MATRIX SIZE	0.26L x ().47W	6.6L x	11.9W	SA-XX-062YE-350	$350 \pm 0.2\%$ $350 \pm 0.4\%$	W, L
120WY		.v			Three-element 60° delt	a stacked rosette.	
					WA-XX-120WY-120	120 ± 0.5% 350 + 0.5%	
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	0	VERALL WIDTH	WD-DY-120WY-350 WK-XX-120WY-120	$350 \pm 0.5\%$ $120 \pm 0.5\%$	
0.120 ES	0.34 M	0.080 ES	6	0.40 M	WK-XX-120WY-350 SA-XX-120WY-120	$350 \pm 0.5\%$ $120 \pm 0.5\%$	
3.05 ES	8.6 M	2.03 ES		10.2 M	SA-XX-120WY-350 SK-XX-120WY-120	$350 \pm 0.5\%$ 120 ± 0.5%	

125UY	'C' FEATURE				Three-element 60° delt	a single-plane roset	te.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	H	OVERALL WIDTH			CEA-Series Strain Gages feature large copper solder tabs and a completely
0.125 ES	0.375 CP	0.062 E	ES	0.375 CP			encapsulated grid.
3.18 ES	9.53 CP	1.57 E	S	9.53 CP	CEA-XX-125UY-120	120 + 0.4%	
MATRIX SIZE	0.50L x (0.44W	12.7	L x 11.2W	CEA-XX-125UY-350	$350 \pm 0.4\%$	

8.6L x 10.2W

SK-XX-120WY-350 SD-DY-120WY-350 $350 \pm 0.5\%$

 $350 \pm 0.5\%$

MATRIX SIZE

0.34L x 0.40W

Delta Rosettes

Vishay Micro-Measurements



General Purpose Strain Gages - Delta Rosettes

ES = Each section S = Section (S1)	TERN Actu Enla on CP = = Sec 1) M = I	ial size shown. Irged when necessa Complete pattern Matrix	ry for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125YA		· ·		Compact three-elemer	it 60° delta rosette w	ith large solder tabs.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.375 CP	0.062 ES	0.375 CP			
3.18 ES	9.53 CP	1.57 ES	9.53 CP	EA-XX-125YA-120 EP-08-125YA-120	$120 \pm 0.2\%$ $120 \pm 0.2\%$ $120 \pm 0.4\%$	L, LE
MATRIX SIZE	0.55L x (0.45W 14.0	DL x 11.4W	SK-XX-125YA-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	
125YF	مريد	Ne		Three-element 60° delt particularly for use with	ta rosette with high-r Option W in the EA	esistance grid. Designed Series.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.283 CP	0.060 ES	0.620 CP			
3.18 ES	7.19 CP	1.52 ES	15.75 CP	EA-XX-125YE-350	350 + 0.2%	w
MATRIX SIZE	0.36L x (0.70W 9.1	L x 17.8W	WA-XX-125YF-350	$350 \pm 0.4\%$	W*
250UY		(C')	FEATURE	Three-element 60° del	ta single-plane roset	te.
						CEA-Series Strain Gages
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			feature large copper solder tabs and a completely encapsulated grid
0.250 ES	0.750 CP	0.125 ES	0.750 CP			choupouldiou griu.
6.35 ES	19.05 CP	3.18 ES	19.05 CP	CEA-XX-250LIV-120	120 + 0.4%	
MATRIX SIZE	0.99L x (0.85W 25.1	IL x 21.6W	CEA-XX-250UY-350	350 ± 0.4%	



General Purpose Strain Gages - Delta Rosettes

GAGE PAT ES = Each sectio S = Section (S1	TERN Actu Enla n CP = = Sec 1) M = I	al size shown. Irged when nece Complete patte Matrix	essary for definition. ern inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
250WY				Three-element 60° del	ta stacked rosette.	
GAGE	OVERALL	GRID	OVERALL	WA-XX-250WY-120 WA-XX-250WY-350 WD-DY-250WY-350 WK-XX-250WY-120	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
0.250 ES	0.51 M	0.125 ES	0.60 M	WK-XX-250WY-350 SA-XX-250WY-120	$350 \pm 0.5\%$ $120 \pm 0.5\%$ $120 \pm 0.5\%$	
6.35 ES	13.0 M	3.18 ES	15.2 M	SA-XX-250WY-350 SK-XX-250WY-120 SK-XX-250WX-350	$350 \pm 0.5\%$ $120 \pm 0.5\%$ $350 \pm 0.5\%$	
MATRIX SIZE	0.51L x (.60W 13.0L x 15.2W		SD-DY-250WY-350	$350 \pm 0.5\%$ $350 \pm 0.5\%$	
250YA				Three-element 60° delt	a single-plane rosett	e.

		Par-			Three-element 60° delta single-plane rosette.			
		7						
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH		OVERALL WIDTH				
0.250 ES	0.750 CP	0.125 E	S	0.750 CP		100 1 0 00/		
6.35 ES	19.05 CP	3.18 ES		19.05 CP	EA-XX-250YA-120 EP-08-250YA-120 SA-XX-250YA-120	$120 \pm 0.2\%$ $120 \pm 0.2\%$ $120 \pm 0.4\%$		
MATRIX SIZE	0.99L x 0.85W		25.1	L x 21.6W	SK-XX-250YA-350	350 ± 0.4%		

500WY	Í				Three-element 60° delta stacked rosette.			
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH	WA-XX-500WY-120 WA-XX-500WY-350	120 ± 0.5% 350 ± 0.5%		
0.500 ES	0.76 M	0.120	ES	0.84 M	WD-DY-500WY-350 WK-XX-500WY-350	$350 \pm 0.5\%$ $350 \pm 0.5\%$ $100 \pm 0.5\%$		
12.70 ES	19.3 M	3.05 ES		21.3 M	SA-XX-500WY-120 SA-XX-500WY-350 SK-XX-500WY-350	$120 \pm 0.5\%$ $350 \pm 0.5\%$ $350 \pm 0.5\%$		
MATRIX SIZE	0.76L x 0.84W 19.3		L x 21.3W	SD-DY-500WY-350	$350 \pm 0.5\%$			


General Purpose Strain Gages - Shear/Torque Patterns

FEATURES

- · Gage patterns designed for measuring shear strain and torque
- Individual and multiple grid patterns
- Gage lengths from 0.062 in (1.57mm) to 0.250 in (6.35mm)

GAGE PAT	TERN Actu	ual size shown. arged when nece	essary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1	on CP = = Sec 1) M =	Complete patte Matrix	ern inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062DL				45° torque gage. See 0 pattern. See also 062DF	62DW pattern for hig R pattern.	her resistance version of this
	1X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-062DL-060 ED-DY-062DL-175	60 ± 0.15% 175 ± 0.4%	E, L, LE E, L*, LE*
0.062	0.175	0.066	0.055	WA-XX-062DL-060 WK-XX-062DL-175	$60 \pm 0.3\%$ 175 ± 0.3%	
1.57	4.45	1.68	1.40	SA-XX-062DL-000 SK-XX-062DL-175 SD-DY-062DL-175	175 ± 0.3% 175 ± 0.8%	
MATRIX SIZE	0.30L x 0	0.15W	7.6L x 3.8W	WD-DY-062DL-175	175 ± 0.8%	
062DR				45° torque gage. Similar	r to 062DL pattern bu	It with opposite grid angle.
		, 11				
	1%	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-062DR-060 ED-DY-062DR-175	60 ± 0.15% 175 ± 0.4%	E, L, LE E, L*, LE*
0.062	0.175	0.066	0.055	WA-XX-062DR-060 WK-XX-062DR-175	$\begin{array}{c} 60 \pm 0.3\% \\ 175 \pm 0.3\% \\ 60 \pm 0.3\% \end{array}$	
1.57	4.45	1.68	1.40	SK-XX-062DR-000 SK-XX-062DR-175 SD-DY-062DR-175	175 ± 0.3% 175 ± 0.8%	
MATRIX SIZE	0.30L x 0	0.15W	7.6L x 3.8W	WD-DY-062DR-175	175 ± 0.8%	

*Options available but not normally recommended. See Gage Series and Optional Features datasheet for details.



General Purpose Strain Gages - Shear/Torque Patterns

GAGE PAT ES = Each sectio S = Section (S1:	TERN Actu Enla n CP = = Sec 1) M = I	al size shown. Irged when nece Complete patte Matrix	essary for definition. ern inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE		
062DW				45° torque gage. Simila also 062DY pattern.	ar to 062DL pattern e	xcept for grid resistance. See		
	1X	2X						
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-062DW-120 ED-DY-062DW-350	120 ± 0.15% 350 ± 0.4%	E, L, LE E, L*, LE*		
0.062	0.175	0.055	0.055	WA-XX-062DW-120 WK-XX-062DW-350	$\begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \\ \end{array}$			
1.57	4.45	1.40	1.40	SA-XX-062DW-120 SK-XX-062DW-350 SD-DY-062DW-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.8\%$			
MATRIX SIZE	0.30L x 0).15W	7.6L x 3.8W	WD-DY-062DW-350	$350 \pm 0.8\%$ $350 \pm 0.8\%$			
062DY	062DY				45° torque gage. Similar to 062DW pattern but with opposite grid angle.			
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-062DY-120 ED-DY-062DY-350	120 ± 0.15% 350 ± 0.4%	E, L, LE E, L*, LE*		
0.062	0.175	0.055	0.055	WA-XX-062DY-120 WK-XX-062DY-350	$\begin{array}{c} 120 \pm 0.3\% \\ 350 \pm 0.3\% \\ 120 \pm 0.3\% \end{array}$			
1.57	4.45	1.40	1.40	SA-XX-062DY-120 SK-XX-062DY-350 SD-DY-062DY-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.8\%$			
MATRIX SIZE	0.30L x ().15W	7.6L x 3.8W	WD-DY-062DY-350	$350 \pm 0.8\%$			
062TH				Two-element 90° torque gage. Sections are electrically independent. See also 062TV and 062TW patterns.				
	1X 2X							
GAGE		GRID	OVERALL					

LENGTH	LENGTH	WIDTH	ł	WIDTH			
0.062 ES	0.175 CP	0.055 E	ES	0.115 CP			
1.57 ES	4.45 CP	1.40 E	S	2.92 CP	EA-XX-062TH-120 SA-XX-062TH-120	120 ± 0.2% 120 ± 0.4%	E, L, LE
MATRIX SIZE	0.27L x	0.21W	6.9	L x 5.3W	SK-XX-062TH-350	$350 \pm 0.4\%$	

*Options available but not normally recommended. See Gage Series and Optional Features datasheet for details.



GAGE PAT	TERN Actu	ial size shown. Irged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1	on CP = = Sec 1) M =	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
062TV	·•••			Two-element 90° torque	gage. Similar to 062Tl	H pattern except for resistance.
	1X	2X				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	_		
0.062 ES	0.175 CP	0.055 ES	0.115 CP	-		
1.57 ES	4.45 CP	1.40 ES	2.92 CP	EA-XX-062TV-350	350 ± 0.2%	E, L, LE
MATRIX SIZE	0.27L x (0.21W 6.9	9L x 5.3W	SK-XX-062TV-500	500 ± 0.4%	
062TW				Two-element 90° torque have a common solder t	e gage. Similar to 06 ab.	62TH pattern except sections
	1X	2X	1	_		
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	-		
0.062 ES	0.175 CP	0.055 ES	0.115 CP	FA-XX-062TW-120	120 + 0.2%	E.I.I.F
1.52 ES	4.45 CP	1.40 ES	2.92 CP	WK-XX-062TW-350 SA-XX-062TW-120	350 ± 0.4% 120 ± 0.4%	-, -,
MATRIX SIZE	0.27L x 0	0.21W 6.9	9L x 5.3W	SK-XX-062TW-350	350 ± 0.4%	
062UV	Â	¢.	FEATURE	Two-element 90° rosette have a common electric 0.07 in (1.0 x 1.8 mm).	for torque and shear- cal connection. Expo	strain measurement. Sections sed solder tab area is 0.04 x
· m .						CEA-Series Strain Gages feature large copper solder tabs and
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			encapsulated grid.
0.062 ES	0.330 CP	0.063 ES	0.160 CP			Available in Option P2 (preattached leadwire cables).
1.57 ES	8.38 CP	1.60 ES	4.06 CP	CEA-XX-062UV-350	350 ± 0.4%	
MATRIX SIZE	0.42L x 0).23W 10.	7L x 5.8W	CEA-XX-062UV-500	500 ± 0.4%	



Shear/Torque Patterns

Vishay Micro-Measurements

GAGE PAT	TERN Actu Enla	ial size shown. Irged when nec	essary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is		
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete patt Matrix	ern inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE	
						L	
090DW				45° torque gage. Larger	version of 062DW pa	ttern. See also 090DY pattern.	
	1X	2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-090DW-120 EA-XX-090DW-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.15\% \\ 120 \pm 0.20\% \end{array}$	E, L, LE E, L, LE	
0.090	0.253	0.080	0.080	WA-XX-090DW-120 WA-XX-090DW-350 WK-XX-090DW-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.3\%$		
2.29	6.43	2.03	2.03	SA-XX-090DW-120 SA-XX-090DW-350	120 ± 0.3% 350 ± 0.3%		
MATRIX SIZE	0.38L x ().19W	9.7L x 4.8W	SK-XX-090DW-350	350 ± 0.3%		
090DY				45° torque gage. Similar to the 090DW pattern except opposite grid angle.			
	1X	2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	EA-XX-090DY-120 EA-XX-090DY-350	$120 \pm 0.15\%$ $350 \pm 0.15\%$	E, L, LE E, L, LE	
0.090	0.253	0.080	0.080	WA-XX-090DY-120 WA-XX-090DY-350 WK-XX-090DY-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$ $350 \pm 0.3\%$		
2.29	6.43	2.03	2.03	SA-XX-090DY-120 SA-XX-090DY-350	120 ± 0.3% 350 ± 0.3%		
MATRIX SIZE	0.38L x ().19W	9.7L x 4.8W	SK-XX-090DY-350	350 ± 0.3%		
090TW			Small two-element 90° t	torque gage. Both se	ctions share a common tab.		
) `				
	1X	2X					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH				
0.093 ES	0.250 CP	0.083 ES	0.170 CP				
2.36 ES	6.35 CP	2.11 ES	4.32 CP	EA-XX-090TW-120	120 ± 0.2%	E, L, LE	
MATRIX SIZE	0.37L x 0).27W	9.4L x 6.9W	SK-XX-090TW-350	350 ± 0.4%		

Shear/Torque Patterns

Vishay Micro-Measurements



GAGE PAT	TERN Actu	ial size shown. arged when necessai	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is		
ES = Each sectio S = Section (S1	n CP = = Sec 1) M =	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE	
120NB				Full-bridge pattern for sh All grids matched in gag also 120NC pattern.	near-strain measuren ge factor and K_t for l	nent. Very compact geometry. highest overall accuracy. See	
		<u></u>					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH				
0.120 ES	0.425 CP	0.150 ES	0.440 CP			07	
3.05 ES	10.80 CP	3.81 ES	11.18 CP	EA-XX-120NB-120 WK-XX-120NB-350	$120 \pm 0.3\%$ $350 \pm 0.6\%$	SE	
MATRIX SIZE	0.47L x ().47W 11.9	0L x 11.9W	SK-XX-120NB-120 SK-XX-120NB-350	$120 \pm 0.6\%$ 350 ± 0.6%		
120NC				Full-bridge pattern for sh except for resistance.	near-strain measuren	nent. Similar to 120NB pattern	
CAGE		CPID	OVERALL				
LENGTH	LENGTH	WIDTH	WIDTH				
0.120 ES	0.425 CP	0.150 ES	0.440 CP				
3.05 ES	10.80 CP	3.81 ES	11.18 CP	EA-XX-120NC-350 SA-XX-120NC-350	$350 \pm 0.3\%$ $350 \pm 0.6\%$	SE	
MATRIX SIZE	0.47L x ().47W 11.9	L x 11.9W	SK-XX-120NC-10C	1000 ± 0.6%		
125DL		e.		45° torque gage. Similar also 125DW pattern.	to 125DR pattern bu	t with opposite grid angle. See	
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH				
0.125	0.350	0.110	0.110	EA-XX-125DL-060	60 ± 0.15%	E, L, LE	
3.18	8.89	2.79	2.79	WA-XX-125DL-060 WK-XX-125DL-175	$175 \pm 0.3\%$ $175 \pm 0.3\%$ $60 \pm 0.3\%$		
MATRIX SIZE	0.48L x (0.20W 12.	2L x 5.1W	SK-XX-125DL-175	175 ± 0.3%		



General Purpose Strain Gages - Shear/Torque Patterns

GAGE PATTERN Actual size shown. Enlarged when necessary for definition					GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each sectionCP = Complete patterninchS = Section (S1= Sec 1)M = Matrixmillimeter					Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
125DR					45° torque gage. Simila	r to 125DL pattern bu	it with opposite grid angle.
	1	2 x					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI	, -1	OVERALL WIDTH			
0.125	0.350	0.110)	0.110	EA-XX-125DR-060	60 ± 0.15%	E, L, LE
3.18	8.89	2.79		2.79	WA-XX-125DR-060 WK-XX-125DR-175 SA-XX-125DR-060	$60 \pm 0.3\%$ $175 \pm 0.3\%$ $60 \pm 0.3\%$	
MATRIX SIZE	0.48L x 0).20W	12.2	2L x 5.1W	SK-XX-125DR-175	175 ± 0.3%	
125DW					45° torque gage. Simila also 125DY pattern.	r to 125DL pattern e:	xcept for grid resistance. See
GAGE	OVERALL	GRID)				
0.125	0.350	0.110)	0.110	EA-XX-125DW-120	120 ± 0.15%	E, L, LE
3.18	8.89	2.79		2.79	WA-XX-125DW-350 WK-XX-125DW-350	$350 \pm 0.3\%$ 120 ± 0.3% 350 ± 0.3%	E, L , LE
MATRIX SIZE	0.48L x ().21W	12.2	2L x 5.3W	SA-XX-125DW-120 SK-XX-125DW-350	$120 \pm 0.3\%$ $350 \pm 0.3\%$	
125DY					45° torque gage. Simila	r to 125DW pattern b	ut with opposite grid angle.
GAGE LENGTH	OVERALL GRID OVERALL LENGTH WIDTH WIDTH						
0.125	0.350	0.110)	0.110	EA-XX-125DY-120 ED-DY-125DY-350	$\begin{array}{c} 120 \pm 0.15\% \\ 350 \pm 0.3\% \\ 120 \pm 2.22\% \end{array}$	E, L, LE E, L*, LE*
3.18	8.89	2.79		2.79	WA-XX-125DY-120 WK-XX-125DY-350 SA-XX-125DY-120	$120 \pm 0.3\% \\ 350 \pm 0.3\% \\ 120 \pm 0.3\%$	
MATRIX SIZE	0.48L x ().21W	12.2	2L x 5.3W	SK-XX-125DY-350	350 ± 0.3%	

*Options available but not normally recommended. See Gage Series and Optional Features datasheet for details.

Shear/Torque Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Shear/Torque Patterns

GAGE PAT	TERN Actu Enla	al size shown. Irged when necessa	ry for definition.	GAGE DESIGNATION Insert desired S-T-C	RES. IN OHMS Tolerance is increased when	OPTIONS AVAILABLE
ES = Each sectio S = Section (S1	n CP = = Sec 1) M = I	Complete pattern Matrix	millimeter	number in spaces marked XX.	Option W, E, SE, LE, or P is specified.	
125TH				Two-element 90° torque also 125TW and 125TK	e gage. Sections are patterns.	electrically independent. See
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.350 CP	0.110 ES	0.230 CP	EA-XX-125TH-120	120 ± 0.2%	E, L, LE
3.18 ES	8.89 CP	2.79 ES	5.84 CP	WK-XX-125TH-120 WK-XX-125TH-350 SA-XX-125TH-120	$120 \pm 0.4\%$ $350 \pm 0.4\%$ $120 \pm 0.4\%$	
MATRIX SIZE	0.44L x (0.31W 11.3	2L x 7.9W	SK-XX-125TH-350	350 ± 0.4%	
125 TK	Z	8		High-resistance two-ele except sections are elec	ement 90° torque ga ctrically independent.	ge. Similar to 125TL pattern See also 125TH pattern.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	0.320 CP	0.110 ES	0.225 CP	EA-XX-125TK-350	350 ± 0.2%	E, L, LE
3.18 ES	8.13 CP	2.79 ES	5.72 CP	WA-XX-125TK-350 WK-XX-125TK-10C SA-XX-125TK-350	$350 \pm 0.4\%$ 1000 ± 0.4% 350 ± 0.4%	
MATRIX SIZE	0.40L x (0.31W 10.	2L x 7.9W	SK-XX-125TK-10C	1000 ± 0.4%	
125TL	7			High-resistance two-ele solder tab. See also 12	ment 90° torque gag 5TK and 125TW patte	ge. Sections share a common erns.
GAGE LENGTH	OVERALL GRID OVERALL LENGTH WIDTH WIDTH					
0.125 ES	0.320 CP	0.110 ES 0.225 CP		EA-XX-125TL-350	350 ± 0.2%	E, L, LE
3.18 ES	8.13 CP	2.79 ES	5.72 CP	WK-XX-125TL-10C SA-XX-125TL-350	1000 ± 0.4% 350 ± 0.4%	
MATRIX SIZE	0.42L x (0.32W 10.	7L x 8.1W	SK-XX-125TL-10C	1000 ± 0.4%	



General Purpose Strain Gages - Shear/Torque Patterns

ES = Each section S - Section (S1 - Sec 1) M = Matrix Inch millimeter Increased when unber in spaces OPTIONS AVAILABLE 125TR Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix OPTIONS AVAILABLE 125TR Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix GAGE OVERALL LENGTH GRID WIDTH OVERALL WIDTH Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix 0.125 ES 0.276 CP 0.125 ES 0.392 CP Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix Imate in section (S1 - Sec 1) M = Matrix MATRIX SIZE 0.361 k 0.47W 9.11 k 11.9W SK XX 125TR 10C 100 ± 0.4% W' I25 ES 0.380 CP 0.110 ES 0.230 CP SK XX 125TR 10C 100 ± 0.4% W' MATRIX SIZE 0.441 k 0.33W 112 k 8.4W SK XX 125TR 10C 100 ± 0.4% W' MATRIX SIZE 0.441 k 0.33W 112 k 8.4W SK XX 125TR 10C	GAGE PAT	TERN Actu	ial size shown. Irged when necessa	ry for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
125TR Two-element 90° torque rosette. EK-Series gages are supplied with duple copper dots (DD) when optional feature W or SE is not specified. GAGE OVERALL ENGTH GRID WIDTH OVERALL STR 450 120 ± 0.2% (20 ± 0.	ES = Each sectio S = Section (S1	on CP = = Sec 1) M = I	Complete pattern Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
GAGE LENGTH OVERALL VERALL GRID WITH OVERALL WITH EA-XX-125TR-100 EA-XX-125TR-100 SRXX-125TR-100 SRXX-125TR-100 SRXX-125TR-100 120 ± 0.2% SGD ± 0.2% SGD ± 0.2% WITH W. E, L, LE W. E, L, LE W. E, L, LE 0.125 ES 0.276 CP 0.125 ES 0.392 CP SRXX-125TR-100 SRXX-125TR-100 1000 ± 0.2% WITH WITH WITH 0.125 ES 0.276 CP 0.125 ES 0.392 CP SRXX-125TR-100 SRXX-125TR-100 1000 ± 0.4% SIGD ± 0.4% SIGD ± 0.4% WITH WITH 0.125 ES 0.36L x 0.47W 9.1L x 11.9W SRXX-125TR-100 1000 ± 0.4% SIGD ± 0.4% SIGD ± 0.4% SIGD ± 0.4% WITH 125 TW Image: Similar to 125TH pattern except section have a common solder tab. Image: Similar to 125TH pattern except section have a common solder tab. Image: Similar to 125TH pattern except section have a common solder tab. 120 ± 0.4% SIGD ± 0.4% Image: Similar to 125TH pattern except section have a common solder tab. Image: Similar to 125TH pattern except section have a common solder tab. 120 ± 0.4% SIGD ± 0.4% Image: Similar to 125TH pattern except section have a common solder tab. Image: Similar to 125TH pattern except section have a common solder tab. 120 ± 0.4% SIGD ± 0.4% Image: Similar to 125TH pattern except section have a common solder tab. Image:	125TR				Two-element 90° torque copper dots (DD) when	erosette. EK-Series g optional feature W o	gages are supplied with duplex r SE is not specified.
GAGE LENGTH OVERALL ENGTH OVERALL WIDTH S2K:XX:125TR:10C WAXX:125TR:300 120 ± 0.4% 350 ± 0.4% W* 0.125 ES 0.276 CP 0.125 ES 0.392 CP WX:125TR:300 350 ± 0.4% W* 3.18 ES 7.01 CP 3.18 ES 9.96 CP SX:X:125TR:300 350 ± 0.4% W* MATRIX SIZE 0.36L x 0.47W 9.1L x 11.9W SX:X:125TR:300 350 ± 0.4% W* 125 ES 0.360 CP 0.110 ES 0.320 CP SX:X:125TR:300 350 ± 0.4% W* 125 TW			Y		EA-XX-125TR-120 EA-XX-125TR-350 EK-XX-125TR-10C	$120 \pm 0.2\%$ $350 \pm 0.2\%$ $1000 \pm 0.2\%$	W, E, L, LE W, E, L, LE SE
0.125 ES 0.276 CP 0.125 ES 0.392 CP WAX X251R-390 WK-XX:125TR-100 SAXX:125TR-100 SAXX:125TR-100 SAXX:125TR-100 SAXX:125TR-100 SAXX:125TR-100 350 ± 0.4% 350 ± 0.4% 350 ± 0.4% W' MATRIX SIZE 0.36L x 0.47W 9.1L x 11.9W SK-XX-125TR-100 SAXX:125TR-100 350 ± 0.4% 350 ± 0.4% W' 125 TW 9.1L x 11.9W SK-XX-125TR-100 1000 ± 0.4% W' 125 TW 9.1L x 11.9W SK-XX-125TR-100 1000 ± 0.4% V' 125 TW 9.1L x 11.9W SK-XX-125TR-100 1000 ± 0.4% V 0.125 ES 0.350 CP 0.110 ES 0.230 CP EA-XX-125TW-120 120 ± 0.2% E, L, LE 3.18 ES 8.89 CP 2.79 ES 5.84 CP WAXX-125TW-30 350 ± 0.4% E, L, LE 3.18 ES 8.89 CP 2.79 ES 5.84 CP SK-XX-125TW-30 350 ± 0.4% SK-XX-125TW-30 350 ± 0.4% E, L, LE MATRIX SIZE 0.44L x 0.33W 11.2L x 8.4W SK-XX-125TW-30 350 ± 0.4% SG ± 0.4%<	GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	S2K-XX-125TR-10C WA-XX-125TR-120	$\begin{array}{c} 1000 \pm 0.2\% \\ 1000 \pm 0.4\% \\ 120 \pm 0.4\% \end{array}$	W* W*
3.18 ES 7.01 CP 3.18 ES 9.96 CP SA:XX:125TR:120 SA:XX:125TR:350 SK:XX:125TR:350 SK:XX:125TR:350 SK:XX:125TR:350 SK:XX:125TR:350 125 ± 0.4% 350 ± 0.4% SK:XX:125TR:350 125TW Image: Comparison of the second s	0.125 ES	0.276 CP	0.125 ES	0.392 CP	WA-XX-125TR-350 WK-XX-125TR-350 WK-XX-125TR-10C	$350 \pm 0.4\%$ $350 \pm 0.4\%$ $1000 \pm 0.4\%$	W* W*
MATRIX SIZE 0.36L × 0.47W 9.1L × 11.9W SKXX-125 TR-30C 380 ± 0.4% 125TW ID00 ± 0.4% ID00 ± 0.4% ID00 ± 0.4% 125TW Image: constraint of the second sec	3.18 ES	7.01 CP	3.18 ES	9.96 CP	SA-XX-125TR-120 SA-XX-125TR-350	$\begin{array}{c} 120 \pm 0.4\% \\ 350 \pm 0.4\% \end{array}$	
125TW Two-element 90° torque gage. Similar to 125TH pattern except section have a common solder tab. GAGE LENGTH OVERALL LENGTH GRID WIDTH OVERALL WIDTH EA-XX-125TW-120 WAXX-125TW-120 120 ± 0.2% 120 ± 0.4% 350 ± 0.4% E, L, LE 3.18 ES 0.350 CP 0.110 ES 0.230 CP 120 ± 0.4% WAXX-125TW-120 120 ± 0.4% 350 ± 0.4% E, L, LE MATRIX SIZE 0.44L x 0.33W 11.2L x 8.4W SK-XX-125TW-120 SK-XX-125TW-120 120 ± 0.4% 350 ± 0.4% E, L, LE Two-element 90° rosette for torque and shear-strain measurement. Sections have a common electrical connection. Exposed solder tab area is 0.13 o 0.08 in (3.3 x 2.0 mm). CEA-Series Strain Gages feature large copper solder tabs and a completely encapsulated grid. 0.187 ES 0.560 CP 0.150 ES 0.320 CP Available in Option P2 (preatached leadwire cables 4.75 ES 14.22 CP 3.81 ES 8.13 CP Available in Option P2	MATRIX SIZE	0.36L x (0.47W 9.1	L x 11.9W	SK-XX-125TR-350 SK-XX-125TR-10C	$\begin{array}{c} 350 \pm 0.4\% \\ 1000 \pm 0.4\% \end{array}$	
GAGE LENGTH OVERALL LENGTH GRID WIDTH OVERALL WIDTH EA-XX-125TW-120 WAX-X25TW-120 WA-XX-125TW-120 WA-XX-125TW-120 WA-XX-125TW-120 WA-XX-125TW-120 WA-XX-125TW-120 SO ± 0.4% E, L, LE 3.18 ES 8.89 CP 2.79 ES 5.84 CP S.84 CP 120 ± 0.2% WA-XX-125TW-120 WA-XX-125TW-120 SK-XX-125TW-120 SK-XX-125TW-350 120 ± 0.4% Sto ± 0.4% E, L, LE MATRIX SIZE 0.44L x 0.33W 11.2L x 8.4W SK-XX-125TW-350 SK-XX-125TW-350 350 ± 0.4% E 187UV C'FEATURE Two-element 90° rosette for torque and shear-strain measurement. Sections have a common electrical connection. Exposed solder tab area is 0.13 x 0.08 in (3.3 x 2.0 mm). CEA-Series Strain Gages feature large copper solder tabs and a completely encapsulated grid. GAGE LENGTH OVERALL LENGTH GRID WIDTH OVERALL WIDTH OVERALL GAGE GRID WIDTH OVERALL WIDTH CEA-Series Strain Gages feature large copper solder tabs and a completely encapsulated grid. Available in Option P2 (preattached leadwire cables 1.17 ES 0.560 CP 0.150 ES 0.320 CP Available in Option P2 (preattached leadwire cables Available in Option P2	125TW	,			Two-element 90° torqu have a common solder	e gage. Similar to 1. tab.	25TH pattern except sections
GAGE LENGTH OVERALL WIDTH OVERALL WIDTH OVERALL WIDTH EA-XX-125TW-120 WAX-X125TW-120 120 ± 0.2% 120 ± 0.4% E, L, LE 3.18 ES 8.89 CP 2.79 ES 5.84 CP EA-XX-125TW-120 WK-XX-125TW-120 120 ± 0.4% E, L, LE MATRIX SIZE 0.44L x 0.33W 11.2L x 8.4W SA-XX-125TW-120 SA-XX-125TW-120 120 ± 0.4% E, L, LE Image: Second conduct of the second conduct of							
0.125 ES 0.350 CP 0.110 ES 0.230 CP EA-XX-125TW-120 120 ± 0.2% E, L, LE 3.18 ES 8.89 CP 2.79 ES 5.84 CP WX-XX-125TW-350 350 ± 0.4% 120 ± 0.4% 350 ± 0.4% 120 ±	GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
3.18 ES 8.89 CP 2.79 ES 5.84 CP WK-XX-125 TW-120 WK-XX-125 TW-350 SA-XX-125 TW-350 350 ± 0.4% 350 ± 0.4% MATRIX SIZE 0.44L × 0.33W 11.2L × 8.4W SK-XX-125 TW-350 350 ± 0.4% Image: Strain Capped Strain Ca	0.125 ES	0.350 CP	0.110 ES	0.230 CP	EA-XX-125TW-120	$\begin{array}{c} 120 \pm 0.2\% \\ 120 \pm 0.4\% \\ 350 \pm 0.4\% \\ 120 \pm 0.4\% \end{array}$	E, L, LE
MATRIX SIZE 0.44L x 0.33W 11.2L x 8.4W SK-XX-125TW-350 350 ± 0.4% IBTUV 'C' FEATURE Two-element 90° rosette for torque and shear-strain measurement. Sections have a common electrical connection. Exposed solder tab area is 0.13 × 0.08 in (3.3 x 2.0 mm). CEA-Series Strain Gages feature large copper solder tabs and a completely encapsulated grid. QVERALL LENGTH 0.187 ES 0.560 CP 0.150 ES 0.320 CP 4.75 ES 14.22 CP 3.81 ES 8.13 CP	3.18 ES	8.89 CP	2.79 ES	5.84 CP	WA-XX-125TW-120 WK-XX-125TW-350 SA-XX-125TW-120		
Image:	MATRIX SIZE	0.44L x	0.33W 11	.2L x 8.4W	SK-XX-125TW-350	350 ± 0.4%	
CEA-Series Strain Gages feature large copper solder tabs and a completely encapsulated grid. GAGE LENGTH OVERALL LENGTH OVERALL WIDTH 0.187 ES 0.560 CP 0.150 ES 0.320 CP 4.75 ES 14.22 CP 3.81 ES 8.13 CP	187UV		,C,	FEATURE	Two-element 90° rosette have a common electric 0.08 in (3.3 x 2.0 mm).	for torque and shear- cal connection. Expo	strain measurement. Sections sed solder tab area is 0.13 x
GAGE LENGTHOVERALL WIDTHGHID WIDTHOVERALL WIDTHencapsulated grid.0.187 ES0.560 CP0.150 ES0.320 CPAvailable in Option P2 (preattached leadwire cables)4.75 ES14.22 CP3.81 ES8.13 CP							CEA-Series Strain Gages feature large copper solder tabs and a completely
0.187 ES0.560 CP0.150 ES0.320 CPAvailable in Option P2 (preattached leadwire cables)4.75 ES14.22 CP3.81 ES8.13 CP	GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			encapsulated grid.
4.75 ES 14.22 CP 3.81 ES 8.13 CP	0.187 ES	0.560 CP	0.150 ES	0.320 CP			Available in Option P2 (preattached leadwire cables).
CEA-XX-187UV-120 120 + 0.4%	4.75 ES	44.00.00	0.150 ES 0.320 CP				
MATRIX SIZE 0.63L x 0.39W 15.9L x 9.8W CEA-XX-187UV-350 350 ± 0.4%		14.22 CP	5.01 L5		CEA-XX-187UV-120	120 + 0.4%	

commended. See es datasheet for details.

Shear/Torque Patterns

Vishay Micro-Measurements



General Purpose Strain Gages - Shear/Torque Patterns

GAGE PAT ES = Each sectio S = Section (S1:	TERN Actu Enla n CP = = Sec 1) M = I	al size shown. Irged when necessa Complete pattern Matrix	ry for definition.	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or B is apposited	OPTIONS AVAILABLE
	/				or P is specified.	
250TK				Two-element 90° torque electrically independent	ue gage with comp . See also 250TL pat	act geometry. Sections are tern.
				EA-XX-250TK-120 EA-XX-250TK-350 EA-XX-250TK-10C WA-XX-250TK-120 WA-XX-250TK-350 WA-XX-250TK-10C	$\begin{array}{c} 120 \pm 0.2\% \\ 350 \pm 0.2\% \\ 1000 \pm 0.2\% \\ 120 \pm 0.4\% \\ 350 \pm 0.4\% \\ 1000 \pm 0.4\% \end{array}$	E, L, LE E, L, LE E, L, LE E, L, LE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WK-XX-250TK-350 WK-XX-250TK-10C WK-XX-250TK-30C	$350 \pm 0.4\%$ 1000 ± 0.4% 2000 ± 0.4%	
0.250 ES	0.640 CP	0.220 ES	0.450 CP	SA-XX-250TK-120 SA-XX-250TK-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	
6.35 ES	16.26 CP	5.59 ES	11.43 CP	SA-XX-250TK-10C SK-XX-250TK-350 SK-XX-250TK-10C	$1000 \pm 0.4\%$ $350 \pm 0.4\%$ $1000 \pm 0.4\%$	
MATRIX SIZE	0.74L x 0).55W 18.8	3L x 14.0W	SK-XX-250TK-30C	$3000 \pm 0.4\%$	
250TL				Two-element 90° rosett sections have a commor with duplex copper pad	e torque gage. Simila n electrical connection s (DP) when optional	ar to the 250TK pattern except . EK-Series gages are supplied feature SE is not specified.
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.250 ES	0.640 CP	0.220 ES	0.450 CP	EA-XX-250TL-350 EK-XX-250TL-10C	$\begin{array}{c} 350\ \pm\ 0.2\%\\ 1000\ \pm\ 0.2\%\end{array}$	E, L, LE SE
6.35 ES	16.26 CP	5.59 ES	11.43 CP	WA-XX-2501L-350 WK-XX-250TL-10C	$350 \pm 0.4\%$ 1000 ± 0.4%	
MATRIX SIZE	0.74L x (0.55W 18.8	8L x 14.0W	SK-XX-250TL-10C	1000 ± 0.4%	
250TR				Two-element 90° rosett Series gages are supp feature W or SE is not s	te for shear-strain an lied with duplex cop specified.	d torque measurements. EK- per pads (DP) when optional
	١Ŷ,			EA-XX-250TR-120 EA-XX-250TR-350 EK-XX-250TR-10C S2K-XX-250TR-10C	$\begin{array}{c} 120 \pm 0.2\% \\ 350 \pm 0.2\% \\ 1000 \pm 0.2\% \\ 1000 \pm 0.4\% \end{array}$	W, E, L, LE W, E, L, LE W, SE
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	WA-XX-250TR-120 WA-XX-250TR-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	W* W*
0.250 ES	0.550 CP	0.250 ES	0.794 CP	WK-XX-250TR-350 WK-XX-250TR-10C	$350 \pm 0.4\%$ $1000 \pm 0.4\%$	W* W*
6.35 ES	13.97 CP	6.35 ES	20.17 CP	SA-XX-250TR-120 SA-XX-250TR-350 SK-XX-250TR-350	$120 \pm 0.4\% \\ 350 \pm 0.4\% \\ 350 \pm 0.4\%$	
MATRIX SIZE	0.70L x	0.96W 17.	8L x 24.4W	SK-XX-250TR-10C	1000 ± 0.4%	

*Options available but not normally recommended. See Gage Series and Optional Features datasheet for details.



Shear/Torque Patterns

Vishay Micro-Measurements

GAGE PAT ES = Each section	TERN Actu Enla	al size show arged when r Complete p	vn. necessar pattern	y for definition.	GAGE DESIGNATION Insert desired S-T-C number in spaces	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE,	OPTIONS AVAILABLE
3 = 3601011 (31:		Viallix		millimeter	marked XX.	or P is specified.	
250US 'C' FEATURE				FEATURE	Four-element full-bridge spaced 90° apart, and area is 0.16 x 0.10 in (4	e pattern for shear-si 45° from pattern ce .1 x 2.5 mm).	train measurement. Grids are nterlines. Exposed solder tab
							CEA-Series Strain Gages
GAGE LENGTH	GAGE LENGTHOVERALL LENGTHGRID WIDTHOVERALL WIDTH0.250 ES0.820 CP0.120 ES0.700 CP		OVERALL WIDTH			feature large copper solder tabs and	
0.250 ES					a completely encapsulated grid.		
6.35 ES	6.35 ES 20.83 CP 3.05 ES 17.78 CP		CEA-XX-250US-120	120 + 0.4%			
MATRIX SIZE	0.96L x	W08.0	24.4	L x 20.3W	CEA-XX-250US-350	350 ± 0.4%	

Vishay BLH



FAE (Constantan Foil, Polyimide Carrier) Series Strain Gages

The complete range of Vishay BLH SR-4[®] strain gages and installation accessories are now a part of the extensive line of Vishay measurement products. And, while many similar Vishay Micro-Measurements strain gages and installation accessories are also available, our customers will continue to have the option of purchasing those Vishay BLH SR-4 products with which they are already familiar, whenever possible.

A representative listing of the most popular Vishay BLH SR-4 general-purpose strain gages are shown here. For availability of other Vishay BLH SR-4 strain gages in other patterns and series - including those for transducer applications - please contact the Customer Service Department at Vishay Micro-Measurements.

GAGE	PATTERN		DIMENSIONS	- INCHES/N	ILLIMETERS	;		
		GRID	OVERALL	GRID	MATR	IX SIZE	R - OHMS	DESIGNATION
		LENGTH (a)	LENGTH (b)	WIDTH (C)	L (d)	W (e)		
Half-Square Grid	General Purpose	0.250/6.35	0.350/8.89	0.125/3.18	0.548/13.92	0.250/6.35	120 ± 0.2	FAE-25-12SX
	- e -	0.250/6.35	0.350/8.89	0.125/3.18	0.548/13.92	0.250/6.35	350 ± 0.5	FAE-25-35SX
	SR-4	0.235/5.97	0.425/10.79	0.175/4.44	0.710/18.03	0.465/11.81	1000 ± 0.2	FAE-25-100SX
		0.125/3.18	0.180/4.57	0.065/1.65	0.354/8.99	0.175/4.45	120 ± 0.2	FAE-12-12SX
	- a	0.125/3.18	0.180/4.57	0.062/1.57	0.395/9.12	0.180/4.57	350 ± 0.5	FAE-12-35SX
		0.125/3.18	0.185/4.70	0.062/1.57	0.364/9.25	0.185/4.70	1000 ±0.2	FAE-12-100SX
Square Grid	High Power	0.122/3.10	0.190/4.38	0.125/3.18	0.364/9.25	0.240/6.10	120 ± 0.2	FAE-12S-12SX
	Dissipation	0.125/3.18	0.190/4.38	0.125/3.18	0.375/9.53	0.240/6.10	350 ± 0.5	FAE-12S-35SX
	- e -	0.062/1.57	0.130/3.30	0.062/1.57	0.308/7.82	0.180/4.57	120 ± 0.2	FAE-06S-12SX
	C -	0.062/1.57	0.130/3.30	0.062/1.57	0.308/7.82	0.180/4.57	350 ± 0.5	FAE-06S-35SX
t d b L	- a							
Wide Grid	General Purpose,	0.031/0.79	0.075/1.90	0.062/1.57	0.269/6.83	0.140/3.56	120 ± 0.2	FAE-03W-12SX
a d	e b c							
T-Rosette	General Purpose	0.125/3.18	0.245/6.22	0.125/3.18	0.475/12.07	0.460/11.68	120 ± 0.2	FAET-12A-12SX
	e	0.125/3.18	0.245/6.22	0.125/3.18	0.475/12.07	0.460/11.68	350 ± 0.5	FAET-12A-35SX
d								
3 - Element Rosette	e 45° Planar	0.250/6.35	0.380/9.65	0.125/3.18	0.604/15.34	0.935/23.75	120 ± 0.2	FAER-25B-12SX
		0.250/6.35	0.385/9.56	0.125/3.18	0.600/15.24	0.935/23.75	350 ± 0.5	FAER-25B-35SX
SR-4		0.125/3.18	0.190/4.77	0.062/1.57	0.350/8.89	0.485/12.32	120 ± 0.2	FAER-12B-12SX
d b -		0.125/3.18	0.190/4.77	0.062/1.57	0.355/9.02	0.500/12.70	350 ± 0.5	FAER-12B-35SX



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Large Patterns

Vishay Micro-Measurements



Special Purpose Sensors - Large Patterns

The strain gage patterns listed on these pages employ long measuring grids, and are most commonly used for specialpurpose applications where strain averaging is desired. For example, when measuring strain in concrete it is usually the average strain that is sought rather than any severe local fluctuations in strain occurring at the interfaces between the aggregate particles and the cement. In general, for strain measurement on nonhomogeneous material it is preferable to select a gage length that is large with respect to the size of the inhomogeneity. The large gage patterns listed in this section are well-suited to many of these applications.

GAGE PATTERN	N Actual size shown. Enlarged when necessary	for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1= Sec 1)	CP = Complete pattern) M = Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE

750DT	SEE I	PATTERN			Large general-purpose 750DU pattern.	gage with tab at ea	ch end of grid. See also
BELOW							
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH		OVERALL WIDTH	N2A-XX-750DT-120	120 ± 0.15%	E, L, LE
0.750	1.000	0.110	0.110		EA-XX-750DT-120 WA-XX-750DT-120	$\begin{array}{c} 120 \pm 0.15\% \\ 120 \pm 0.3\% \end{array}$	E, L, LE
19.05	25.40	2.79		2.79	WK-XX-750DT-350 EP-08-750DT-120	$350 \pm 0.3\%$ 120 ± 0.15% 120 ± 0.3%	
MATRIX SIZE	1.14L x	1.14L x 0.21W 29.0L x 5.3W			SK-XX-750DT-350	$350 \pm 0.3\%$	

750DU	SEE F	PATTERN		Large general-purpose gage. Similar to 750DT pattern except for resistance.			
	BE	ELOW					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	N2A-XX-750DU-350 EA-XX-750DU-350 WA-XX-750DU-350	$350 \pm 0.15\%$ $350 \pm 0.15\%$ $350 \pm 0.3\%$	E, L, LE	
0.750	1.000	0.110	0.110			E, L, LE	
19.05	25.40	2.79	2.79	WK-XX-750DU-10C EP-08-750DU-350	$1000 \pm 0.3\%$ $350 \pm 0.15\%$ $350 \pm 0.3\%$		
MATRIX SIZE	1.11L x (0.21W	28.2L x 5.3W	SK-XX-750DU-10C	1000 ± 0.3%		



Special Purpose Sensors - Large Patterns

GAGE PATTERN Actual size show Enlarged when	vn. necessary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section CP = Complete p S = Section (S1= Sec 1) M = Matrix	oattern inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE

10CBE	SEE F	PATTERN			Large general-purpose	gage.	
BELOW							
GAGE LENGTH	OVERALL LENGTH	GRID OVERALL WIDTH WIDTH			N2A-XX-10CBE-120 N2A-XX-10CBE-350	120 ± 0.15% 350 ± 0.15%	W, E, L, LE, P W, E, L, LE, P
1.000	1.250	0.25	0	0.250	EA-XX-10CBE-120 WA-XX-10CBE-120	120 ± 0.15% 120 ± 0.3%	W, E, L, LE, P W*
25.40	31.75	6.35	5	6.35	WK-XX-10CBE-350 EP-08-10CBE-120	$350 \pm 0.3\%$ 120 ± 0.15% 120 ± 0.2%	W*
MATRIX SIZE	1.36L x (0.33W 34.5L x 8.4W			SK-XX-10CBE-350	$350 \pm 0.3\%$	

19CDK	SEE F	PATTERN		Long narrow pattern wi backing to prevent dist	th tabs at ends of g ortion of the grid. Se	rid. The sidebars stabilize the ee also 19CDZ pattern.
	BE	ELOW				
GAGE LENGTH	OVERALL LENGTH	GRID OVERALL WIDTH WIDTH				
1.900	2.071	0.028	0.040	N2A-XX-19CDK-120 EA-XX-19CDK-120 EP-08-19CDK-120 SA XX 10CDK 120	$120 \pm 0.2\%$ $120 \pm 0.2\%$ $120 \pm 0.2\%$ $120 \pm 0.2\%$	L, LE
48.26	52.60	0.71	1.02			L, LE
MATRIX SIZE	2.28L x (0.26W	57.9L x 6.6W	SK-XX-19CDK-350	$120 \pm 0.4\%$ $350 \pm 0.4\%$	
			•	,) , , , , , , , , , , , , , , , , , ,		

19CDZ	SEE F	PATTERN			Similar to 19CDK patter	m except for resista	nce.
	BE	LOW					
GAGE LENGTH	OVERALL LENGTH	GRID OVERA WIDTH WIDT		OVERALL WIDTH			
1.900	2.071	0.033		0.040	N2A-XX-19CDZ-350	350 ± 0.2%	L, LE
48.26	52.60	0.84		1.02	EA-XX-19CDZ-350 EP-08-19CDZ-350	$350 \pm 0.2\%$ $350 \pm 0.2\%$	L, LE
MATRIX SIZE	2.46L x (0.24W 62.5L x 6.1W			SA-XX-19CDZ-350 SK-XX-19CDZ-10C	$350 \pm 0.4\%$ 1000 ± 0.4%	

*Options available but not normally recommended. See Gage Series and Optional Features datasheet for details.

Large Patterns

Vishay Micro-Measurements



Special Purpose Sensors - Large Patterns

GAGE PATTERN	Actual size shown. Enlarged when necessary	for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1= Sec 1)	CP = Complete pattern M = Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE

20CBW	SEE F	PATTERN		For use on concrete and for strain integration on large specimens.			
	BE	ELOW					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	N2A-XX-20CBW-120 N2A-XX-20CBW-350	120 ± 0.2% 350 ± 0.2%	W, E, L, LE, P W, E, L, LE, P	
2.000	2.250	0.188	0.188	EA-XX-20CBW-120 WA-XX-20CBW-120	$120 \pm 0.2\%$ $120 \pm 0.4\%$	W, E, L, LE, P W*	
50.80	57.15	4.78	4.78	EP-08-20CBW-120	$350 \pm 0.4\%$ 120 ± 0.2% 120 ± 0.4%	W^	
MATRIX SIZE	2.46L x	0.32W	62.5L x 8.1W	SK-XX-20CBW-350	$350 \pm 0.4\%$		
				· · · · ·			



*Options available but not normally recommended. See Gage Series and Optional Features datasheet for details.



Special Purpose Sensors - Strip Gage Patterns

A strip gage consists of ten strain-sensitive grids mounted on a common backing. This type of gage offers a number of advantages in the study of local strain distributions and strain gradients. As an example, it is much easier, faster, and more accurate to install the ten-grid strip in a single operation than it would be to align and bond ten individual gages for the same purpose. In addition, the optical tooling employed in the manufacture of the strip gage ensures that all grids are precisely located. Grid spacing is also closer than can usually be achieved with individual gages, thus yielding better resolution of nonuniform strain fields.

Overall dimensions for the complete patterns vary with the grid and solder-tab configurations. When necessary, some types of the gages can be cut to produce smaller assemblies with fewer grids. Most sizes are offered in two different versions — with all grids oriented either parallel to, or perpendicular to, the long axis of the strip. As indicated in the gage listings, several types of strip gages are designed with a common tab, or bus, connected to all grids on one side. Since this arrangement affects measurement accuracy, and may not be compatible with some instrument systems, the following information should be considered when contemplating the use of such gages.

COMMON-TAB STRIP GAGES

Common-tab strip gages are generally not compatible with multi-channel instruments, particularly those incorporating individual bridge excitation supplies. When used with this type of instrumentation, they will yield significantly lower accuracy than a strip gage with electrically independent grids. Effects of the common tab include excessive initial unbalance of the Wheatstone bridge circuit (possibly beyond the balance range of the instrumentation), circulating currents when the grids are powered simultaneously from a common power supply, loss of leadwire temperature compensation, and reduced accuracy in shunt calibration. All of these effects should be carefully considered by the user before selecting strip gages with common tabs. Where greatest accuracy is required, strip gages with electrically independent grids should be employed, or common-tab strip gages may be used with single-channel instruments in conjunction with a switch and balance unit.

For further information, and practical recommendations on the use of common-tab strip gages, request Vishay Micro-Measurements Tech Note TN-516, Errors Due to Shared Leadwires in Parallel Strain Gage Circuits.

GAGE PAT ES = Each section S = Section (S1	TERN Actu Enlation CP = = Sec 1) M =	ual size shov arged when i Complete p Matrix	vn. necessar pattern	ry for definition. inch millimeter	GAGE DESIGNATION Insert desired S-T-C number in spaces marked XX.	RES. IN OHMS Tolerance is increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
020PF		X			Miniature ten-element st common to all sections. to 020MT pattern but between a single point of	trip gage for strain gr Grid centerline spaci with grids rotated 9 n the common tab, a	radient determination. One tab ng 0.035 in (0.89 mm). Similar 10°. Resistance is measured and each individual grid tab.
	- 2	×					
GAGE LENGTH	OVERALL LENGTH	GRII WIDT) H	OVERALL WIDTH			
0.020 ES	0.100 CP	0.030	ES	0.385 CP			
0.51 ES	2.54 CP	0.76	ES	9.78 CP	EA-XX-020PF-120	120 + 1.0%	E. SE. L. LE
MATRIX SIZE	0.19L x (0.48W	4.8I	L x 12.2W	SA-XX-020PF-120	120 ± 2.0%	_,,
020MT					Miniature ten-element st common to all sections. to 020PF pattern but w between a single point o	rip gage for strain gr Grid centerline spaci with grids rotated 9 n the common tab, a	radient determination. One tab ng 0.035 in (0.89 mm). Similar 10°. Resistance is measured and each individual grid tab.

1X	(2X				
GAGE LENGTH	OVERALL LENGTH	GRIE WIDT) H	OVERALL WIDTH			
0.020 ES	0.385 CP	0.025	ES	0.100 CP			
0.51 ES	9.78 CP	0.64 E	ES	2.54 CP	EA XX 020MT 120	120 + 1.0%	ESELIE
MATRIX SIZE	0.48L x (0.19W	12.2	2L x 4.8W	SA-XX-020MT-120	120 ± 2.0%	E, 3E, L, LE

Strip Gage Patterns

Vishay Micro-Measurements



Special Purpose Sensors - Strip Gage Patterns

GAGE PAT	TERN Actu Enla	ual size shown. arged when nec	essary for definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section S = Section (S1	in section CP = Complete pattern inc on (S1= Sec 1) M = Matrix millim		ern inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE
031MF		2		Miniature ten-element grids parallel to long a (2.03 mm). See also 03	strip gage with elec axis of pattern. Gric 31PJ pattern.	trically independent grids. All I centerline spacing 0.080 in
		17171717171717171717171717171717171717				
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.031 ES	0.790 CP	0.032 ES	0.080 CP			
0.79 ES	20.07 CP	0.81 ES	2.03 CP	E4-XX-031ME-120	120 + 0.5%	EGE
MATRIX SIZE	0.94L x (0.19W	23.9L x 4.8W	SA-XX-031MF-120	$120 \pm 1.0\%$	L, 3L

031MH					Similar to 031MF patter of pattern. Grid center mm) alternately.	n except alternate g line spacings 0.090	rids perpendicular to long axis and 0.070 in (2.29 and 1.78
				_			
GAGE LENGTH	OVERALL LENGTH	GRID WIDTI) H	OVERALL WIDTH			
0.031/0.020	0.790 CP	0.032/0.	070	0.080 CP			
0.79/0.51	20.07 CP	0.81/1.	78	2.03 CP		120 + 0.5%	ESE
MATRIX SIZE	0.90L x (0.16W	22.9	9L x 4.1W	SA-XX-031MH-120	$120 \pm 0.5\%$ 120 ± 1.0%	E, 3E

031MY					Similar to 031MF patte	rn except produced	in K alloy.
		22222					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	I	OVERALL WIDTH			
0.031 ES	0.790 CP	0.032 E	S	0.080 CP			
0.79 ES	20.07 CP	0.81 E	S	2.03 CP			
MATRIX SIZE	0.93L x (0.22W	23.6	6L x 5.6W	SK-XX-031MY-120	120 ± 1.0%	



Special Purpose Sensors - Strip Gage Patterns

GAGE PATTERN Ac En	ctual size shown. nlarged when necessary fo	or definition.	GAGE DESIGNATION	RES. IN OHMS Tolerance is	
ES = Each section CP = S = Section (S1= Sec 1) M =	= Complete pattern = Matrix	inch millimeter	Insert desired S-T-C number in spaces marked XX.	increased when Option W, E, SE, LE, or P is specified.	OPTIONS AVAILABLE

031PJ					Miniature ten-element s grids perpendicular to lo in (2.03 mm). See also	strip gage with elec ong axis of pattern. 031MF pattern.	trically independent grids. All Grid centerline spacing 0.080
GAGE LENGTH	OVERALL LENGTH	GRIE WIDT) H	OVERALL WIDTH			
0.031 ES	0.090 CP	0.070	ES	0.790 CP			
0.79 ES	2.29 CP	1.78 E	ES	20.07 CP		120 ± 0.5%	E SE
MATRIX SIZE	0.17L x (0.90W	4.31	_ x 22.7W	SA-XX-031PJ-120	$120 \pm 0.5\%$ 120 ± 1.0%	E, 3E

045PG					Miniature ten-element grids perpendicular to l in (2.41 mm).	strip gage with elec ong axis of pattern.	trically independent grids. All Grid centerline spacing 0.095
ina na na na na na na na na na naj-							
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH			
0.045 ES	0.120 CP	0.085	ES	0.935 CP			
1.14 ES	3.05 CP	2.16	ES	23.75 CP	EA-XX-045PG-120 EP-08-045PG-120	$\begin{array}{c} 120 \pm 0.5\% \\ 120 \pm 0.5\% \end{array}$	E, SE
MATRIX SIZE	0.21L x	1.00W	5.31	_ x 25.4W	SA-XX-045PG-120 SK-XX-045PG-350	$120 \pm 1.0\%$ 350 ± 1.0%	

062MD					Ten-element strip gage parallel to long axis of mm). Resistance is me more compact geometr	e with one tab com f pattern. Grid cent asured across each y.	mon to all sections. All grids erline spacing 0.080 in (2.03 grid. See 062MW pattern for
GAGE LENGTH	OVERALL LENGTH	GRII WIDT	D TH	OVERALL WIDTH			
0.062 ES	0.795 CP	0.062	ES	0.350 CP			
1.57 ES	20.19 CP	1.57	ES	8.89 CP	E4-XX-062MD-120	120 + 0.5%	
MATRIX SIZE	0.91L x (0.43W	23.1	L x 10.9W	EP-08-062MD-120	120 ± 0.5%	

Strip Gage Patterns

Vishay Micro-Measurements



Special Purpose Sensors - Strip Gage Patterns

GAGE PAT	TERN Actu Enla	al size shown. Arged when neces	ssary for definition.	GAGE DESIGNATION Insert desired S-T-C	RES. IN OHMS Tolerance is increased when	OPTIONS AVAILABLE
S = Section (S1:	S = Section (S1 = Sec 1) M = Matrix		number in spaces marked XX.	or P is specified.		
062MW	4			Ten-element strip gage with one tab common to all sections. Similar to 062MD pattern but narrower geometry. All grids parallel to long axis of pattern. Grid centerline spacing 0.080 in (2.03 mm). Resistance is measured across each grid.		
	4 4 4 4					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.062 ES	0.795 CP	0.050 ES	0.168 CP			
1.57 ES	20.19 CP	1.27 ES	4.27 CP	EA-XX-062MW-120	120 + 0.5%	
MATRIX SIZE	0.90L x (0.25W	22.9L x 6.4W	EP-08-062MW-120	120 ± 0.5%	

125MW				Ten-element strip gage parallel to long axis of mm). Resistance is me	e with one tab com pattern. Grid center asured across each	mon to all sections. All grids line spacing is 0.160 in (4.06 grid.
	HORIZONTA					
GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH			
0.125 ES	1.590 CP	0.100 ES	0.336 CP			
3.18 ES	40.39 CP	2.54 ES	8.53 CP			
MATRIX SIZE	1.68L x ().43W	42.7L x 10.9W	EA-XX-125MW-120	$120\pm0.5\%$	



Special Purpose Sensors - High S-T-C Patterns

The thermal coefficient of expansion of a group of materials generically classified as plastics varies greatly with type and the temperature range of interest. Vishay Micro-Measurements offers a variety of standard gage patterns with nominal S-T-C numbers of 30, 40, and 50 ppm/°F (55, 70 and 90 ppm/°C). The gage types noted below are supplied unencapsulated to minimize reinforcement effects. Option L (lead ribbons) is supplied to eliminate risks of damaging the substrate through direct soldering to the tabs of a

bonded gage. Option P (preattached cable) is available, but will increase reinforcement on thin or unfilled plastics.

For detailed specifications, such as dimensions and resistance tolerance, refer to the corresponding gage patterns in the General-Purpose Gage Listings.

Minimum Order Requirement (MOR) may apply.

Special applications and requirements for patterns not listed should be reviewed with our Applications Engineering Department.

GAGE PATTERN Actual size shown.*	GAGE DESIGNATION	OPTIONS AVAILABLE
	EA-30-060CC-350 EP-40-060CC-350 EA-50-060CC-350	L, P L, P L, P
A Market Control of Co	EA-30-125AC-350 EP-40-125AC-350 EA-50-125AC-350	L, P L, P L, P
	EA-30-125RD-350 EA-50-125RD-350	L L
	EA-30-125TQ-350 EP-40-125TQ-350 EA-50-125TQ-350	L L L
	EA-30-250AE-350 EP-40-250AE-350 EA-50-250AE-350	L, P L, P L, P

GAGE PATTERN Actual size shown.*	GAGE DESIGNATION	OPTIONS AVAILABLE
	EA-30-250BF-350 EP-40-250BF-350 EA-50-250BF-350	L, P L, P L, P
	EA-30-250BK-10C EP-40-250BK-10C EA-50-250BK-10C	L, P L, P L, P
	EA-30-250RD-350 EP-40-250RD-350 EA-50-250RD-350	L L L
	EA-30-500BL-350 EP-40-500BL-350 EA-50-500BL-350	L, P L, P L, P

*Leads are not shown at actual length.



Special Purpose Sensors - Residual Stress Patterns

The most widely used practical technique for determining residual stresses is the hole-drilling strain gage method described in ASTM Standard E837. With this method, a specially configured strain gage rosette is bonded to the surface of the test object; and a small, shallow hole is introduced into the structure, through the center of the gage, with a precision drilling apparatus. Strains in the immediate vicinity of the hole are measured, and the relaxed residual stresses are computed from these measurements. The general theory of making residual stress measurements is covered in Vishay Micro-Measurements Tech Note TN-503, Measurement of Residual Stresses by the Hole-Drilling Strain Gage Method and the requisite hardware is described in Bulletin 304.

CONSTRUCTION

All gages are constructed of self-temperature-compensated foil (06 and 13 S-T-C) on a flexible polyimide carrier, and incorporate a centering target for use with a precision milling guide. EA-Series (A-Alloy) gages are available "open-faced" or with solder dots and encapsulation (Option SE); CEA-Series (A-Alloy) gages have encapsulated grids, and rugged, copper-coated solder tabs. Construction of the N2K Series (K-alloy) is similar to the N2A Series and includes copper pads (DP) on the solder tabs. The 062UM gage permits installation adjacent to weldments and intersecting surfaces.

GAGE PATTERN	RES.	DIMENSIONS					
AND DESIGNATION		GAGE	CRID	TYPICAL	HOLE DIA.	MAT	RIX
Insert Desired S-T-C No. in Spaces Marked XX.	OTIMS	LENGTH	CTR'LINE DIA.	Min.	Max.	Length	Width
EA-XX-031RE-120	120 ±0.2%	0.031	0.101	0.03	0.04	0.29	0.29
EA-XX-031RE-120/SE	120 ±0.4%	0.79	2.56	0.8	1.0	7.4	7.4
		Due to sma slight mislo purpose ap	all pattern size, cation of drill he plications.	measurer ole. Patterr	nent error n not recor	can be ma mmended fo	gnified by r general-
N2K-XX-030RR-350/DP	350 ±0.4%	0.030	0.170	0.090	0.100	0.37	0.37
		0.76	4.32	2.3	2.5	9.4	9.4
		Special six output than	-element confi three-element	guration t designs.	hat provid	les somewh	nat higher
EA-XX-062RE-120	120 ±0.2%	0.062	0.202	0.06	0.08	0.42	0.42
EA-XX-062RE-120/SE	120 ±0.4%	1.57	5.13	1.5	2.0	10.7	10.7
		Most widely used RE pattern for general-purpose readers measurement applications.				rpose resid	ual stress
EA-XX-125RE-120	120 ±0.2%	0.125	0.404	0.12	0.16	0.78	0.78
EA-XX-125RE-120/SE	120 ±0.4%	3.18 Larger vers	10.26 ion of the 062R	E pattern.	4.1	19.8	19.8
CEA-XX-062UL-120	120 ±0.4%	0.062	0.202	0.06	0.08	0.50	0.62
		1.57	5.13	1.5	2.0	12.7	15.7
		Fully encap pattern geo	osulated with la metry as 062RI	arge coppe E pattern.	er-coated s	soldering ta	bs. Same
CEA-XX-062UM-120	120 ±0.4%	0.062	0.202	0.06	0.08	0.38	0.48
		1.57	5.13	1.5	2.0	9.6	12.2
		Fully encap special trim from hole co	osulated with alignment ma enter. Limitation	arge copp rks. Trim li ns may exis	per-coated ine spaced st in data r	l soldering d 0.068 in (eduction eq	tabs and 1.73 mm) uations.





Special Purpose Sensors - Magnetic Field Patterns

Intense, time-varying electromagnetic fields with steep gradients in field strength can cause troublesome noise in strain gage circuits. In severe magnetic environments, with low signal levels, the noise amplitude may be several times larger than the strain signal from the gage. Vishay Micro-Measurements H-Series noninductive strain gages have been specially designed to minimize noise pickup in the gage grid due to electromagnetic fields.

H-Series strain gages consist of two identical grids, with one stacked directly above and insulated from, the other. The upper and lower grid elements are connected in series so that current flows in opposite directions through the two grids. With this arrangement, noise voltages induced in the grid tend to be self-cancelling. The counter-current principle employed in H-Series gages is particularly effective against magnetic field gradients parallel to the test surface.

H-Series strain gages have been used very successfully in fusion research applications and similar environments with flux densities to 50 000 gauss.

CONSTRUCTION

H-Series strain gages are constructed with two 350-ohm constantan alloy foil grids on a glass-fiber-reinforced epoxy-phenolic carrier. These fully encapsulated gages include

closely spaced, heavy copper terminals for direct leadwire attachment. H-Series gages are available in both a single-axis and a delta (60°) rosette pattern. The available S-T-C number is 06.

ADHESIVES

Vishay Micro-Measurements M-Bond 600 or AE-15 adhesive systems are particularly recommended; M-Bond 600 produces the thinnest glueline. Adhesive cure temperature should not exceed the maximum sensor operating temperature of +250°F (+120°C).

LEADWIRES

In many cases, the leadwire system itself is the principal source of magnetic noise induction in the measuring circuit. Careful attention to details as outlined in Vishay Micro-Measurements Tech Note TN-501, Noise Control in Strain Gage Measurements, is strongly recommended.

GAGE PATTERN	RES.	DIMENSIONS						
AND DESIGNATION Actual Size Shown	IN OHMS					MAT	RIX	
Insert Desired S-T-C No. in Spaces Marked XX.	er me	GAGE LENGTH	OVERALL LENGTH	GRID WIDTH	OVERALL WIDTH	Length	Width	
H06A-AC1-125-700	700 ±0.5%	0.125	0.49	0.125	0.125	0.61	0.22	
		3.18	12.4	3.18	3.18	15.5	5.6	
		Single-axis	Single-axis pattern with integral copper terminals.					
H06A-AD3-125-700	700 ±0.5%	0.125 ES	0.56	0.080 ES	0.620	0.65	0.70	
		3.18 ES	14.2	2.03 ES	15.75	16.5	17.8	
		Three-elem	Three-element 60° delta rosette with integral copper termin					

Where magnetic noise is likely to be encountered, the selection of the strain gage grid alloy should be given careful consideration. If the grid alloy is magnetic, it will be subject to extraneous physical forces in a magnetic field; and, if magnetoresistive, will undergo spurious resistance changes. Similarly, if the alloy is magnetostrictive, the grid will tend to change length in the magnetic field. While constantan is comparatively free from magnetic effects over its normal operating temperature range, specific measurement applications may indicate desirability of a different sensing grid alloy. Contact our Applications Engineering Department for details.



Special Purpose Sensors - Weldable Patterns

Vishay Micro-Measurements Weldable Strain Gages and Temperature Sensors are specially designed for spot welding to structures and components. They are ideal for applications where test or environmental conditions preclude clamping and curing an adhesively bonded gage installation. These gages are equally advantageous when strain measurements must be made at an elevated temperature, but the nature of the test object does not permit the use of an elevated-temperature-curing adhesive.

Surface preparation requirements are minimal; only an appropriate solvent cleaning and abrasion of the test part surface with silicon-carbide paper or a small, hand-held grinder is needed. Spot welding is accomplished with a portable stored-energy hand-probe spot welder, such as the Model 700. Environmental protection is as easily applied to a welded gage installation as to an adhesively bonded gage.

Refer to Instruction Bulletin B-131 and Catalog A-110 for further information on installation and protective coatings, and to Bulletin 302 for specifications on the Model 700 Welding/Soldering Unit.

DESCRIPTION AND PERFORMANCE

General — All sensors are laboratory-prebonded, with a high-performance adhesive, to thin [0.005 in (0.13 mm)] metal carriers. Sensor grids are fully encapsulated for protection against handling and installation damage. Weldable strain gages are offered in two series to meet differing performance requirements. Both series are available in either 06 or 09 self-temperature compensation. Strain gages with 06 S-T-C have Inconel carriers, while S-T-C 09 gages and temperature sensors are mounted on 300-series stainless steel.

CEA-Series Weldable Strain Gage — Polyimideencapsulated constantan foil grid, with large, rugged, copper-coated tabs. In most cases, the carrier can be contoured to a radius as small as 1/2 in (13 mm). The CEA Series is ideal for direct leadwire attachment, before or after installation.

Strain range is $\pm 5000\mu$ in/in ($\pm 5000\mu$ m/m), and normal operating temperature range is -100° to $+200^{\circ}$ F (-75° to $+95^{\circ}$ C). Short-term maximum temperature is $+300^{\circ}$ F ($+150^{\circ}$ C).

LWK-Series Weldable Strain Gage — Nickel-chromium alloy grid, encapsulated in fiberglass-reinforced epoxy-phenolic. The LWK gage is provided with a three-wire lead system with 10 in (250 mm) of Teflon[®]-insulated leadwire.

This construction simplifies leadwire temperature compensation and provides for easy connection of the lead system to the instrumentation cable. Minimum installation radius is generally limited to 2 in (50 mm).

Strain range is $\pm 5000\mu$ in/in ($\pm 5000\mu$ m/m), and normal operating temperature range is -320° to $+500^{\circ}$ F (-195° to $+260^{\circ}$ C). Short-term maximum temperature is $+550^{\circ}$ F ($+290^{\circ}$ C).

WWT-Series Temperature Sensor — High-purity nickel foil grid encapsulated in fiberglass-reinforced epoxy-phenolic, and equipped with integral three-tab terminal to facilitate leadwire attachment. The temperature sensor is normally installed on a flat surface of the workpiece, but, in any case, should always be oriented with the gridlines in the direction of minimum strain to avoid strain-induced errors (see Vishay Micro-Measurements Tech Note TN-506, Bondable Resistance Temperature Sensors and Associated Circuitry). With an appropriate LST Matching Network, the temperature-response characteristic of the nickel can be linearized and scaled for direct readout (in degrees) with any strain indicator.

[®]Teflon is a Registered Trademark of DuPont.

MEASUREMENT CONSIDERATIONS

It is important to note that operating characteristics of weldable strain gages (gage factor, transverse sensitivity, and thermal output) are specified for the basic strain gage itself — without the metal carrier. Thus, the properties are measured by bonding a conventional strain gage directly to an appropriate calibration specimen, following standard methods specified for all Vishay Micro-Measurements strain gages. This procedure assures the most accurate results, independent of the variables introduced by welding. In particular, the user should be aware that the gage factor specified on the engineering data sheet accompanying the gage applies only to the basic strain gage, without the shim. The effective gage factor of the weldable assembly (after welding to the test member) is commonly 5 to 10% lower than this, due primarily to the stiffness of the shim. The reduction in gage factor is not subject to quantitative generalization, because it depends on the cross-sectional properties of the test specimen, and on the mode of loading (e.g., bending versus direct stress). It has been demonstrated, however, that for a group of like specimens, loaded in the same manner, the weldable gages exhibit very good repeatability and uniformity of response. Therefore, when test requirements dictate greatest accuracy, the weldable gages should be calibrated on a specimen of the same material and cross section as the test part, and under the same mode of loading.



Special Purpose Sensors - Weldable Patterns

GAGE PATTERN	RES.				DI	MENSIO	NS		
AND DESIGNATION	IN	(CARRIER	2	ACTIVI	E GRID	MAT	TRIX	
Insert Desired S-T-C No. in Spaces Marked XX.	Опмэ	Length	Width	Thick	Length	Width	Length	Width	
CEA-XX-W250A-120	120 ±0.4%	0.63	0.34	0.005	0.230	0.125	0.44	0.17	
CEA-XX-W250A-350	350 ±0.4%	16.0	8.6	0.13	5.84	3.18	11.2	4.3	
		Most flex three-co tabs.	Most flexible and conformable pattern. Type 326-DFV and 330-DFV f three-conductor cable typically used to solder directly to copper-coat tabs.						
CEA-XX-W250C-120	120 ±0.4%	0.90	0.90	0.005	0.230	0.125	0.44	0.17	
CEA-XX-W250C-350	350 ±0.4%	22.9	22.9	0.13	5.84	3.18	11.2	4.3	
		Tee rose stresse recomm	22.9 22.9 0.13 5.84 3.18 11.2 4 Tee rosette, used in biaxial stress states where directions of print stresses are known. See W250A pattern for typical lead recommendations. 0.88 0.32 0.005 0.250 0.125 0.62						
LWK-XX-W250B-350	350 ±0.4%	0.88	0.32	0.005	0.250	0.125	0.62	0.17	
		22.4	8.1	0.13	6.35	3.18	15.7	4.3	
		Wide-te preattac protectiv	DIMENSIONS CARRIER ACTIVE GRID MATRIX ength Width Thick Length Width Length Wi 0.63 0.34 0.005 0.230 0.125 0.44 0. 16.0 8.6 0.13 5.84 3.18 11.2 4 Most flexible and conformable pattern. Type 326-DFV and 330-DFV hree-conductor cable typically used to solder directly to copper-coabs. 0.90 0.90 0.005 0.230 0.125 0.44 0. 22.9 22.9 0.13 5.84 3.18 11.2 4 Gee rosette, used in biaxial stress states where directions of primetreses are known. See W250A pattern for typical lead ecommendations. 0.88 0.32 0.005 0.250 0.125 0.62 0. 0.88 0.32 0.005 0.250 0.125 0.62 0. 22.4 8.1 0.13 6.35 3.18 15.7 4 Mide-temperature-range linear pattern with 10-in (250-oractive coatings. 1.15 <t< th=""><th>(250-mm) st bond to</th></t<>				(250-mm) st bond to		
LWK-XX-W250D-350	350 ±0.4%	1.15	1.15	0.005	0.250	0.125	0.62	0.17	
49.0		29.2	29.2	0.13	6.35	3.18	15.7	4.3	
		Tee rose stresse required	1.15 1.15 0.005 0.250 0.125 0.62 0.11 29.2 29.2 0.13 6.35 3.18 15.7 4.3 Tee rosette, used in biaxial stress states where directions of princip stresses are known and a wide operating temperature range required. 0.71 0.43 0.005 0.200 0.200 0.52 0.2						
WWT-TG-W200B-050	50 ±0.4%	0.71	0.43	0.005	0.200	0.200	0.52	0.26	
generating	@ +75°F	18.0	10.9	0.13	5.08	5.08	13.1	6.6	
	(+24°C)	Easy-to bonded sensors	-use temp to the te , see pag	perature est struct es 100-10	sensor tha ure. For s 02.	t can be tandard b	welded or a oondable te	adhesively mperature	



Special Purpose Sensors - Crack Detection Patterns

CD-Series Crack Detection Gages are designed to provide a convenient, economical method of indicating the presence of a crack, or indicating when a crack has progressed to a predetermined location on a test part or structure. By employing several CD gages, it is also possible to monitor the rate of crack growth; however, Crack Propagation Gages would normally be selected for that purpose.

In some applications, thin copper wires bonded to the test structure are used to provide a low-cost method of detecting crack initiation or propagation. Because of the behavior of copper wire, however, this method suffers from two limitations: (a) the crack tip may progress considerably beyond the wire without breaking the strand, and (b) in areas of high cyclic strains, the wire may fail in fatigue without crack initiation in the specimen. CD-Series Crack Detection Gages are designed to overcome both of these limitations.

CD-Series gages consist of a single strand of highendurance alloy. A crack propagating beneath the gage will induce local fracture of the sensing strand and open the electrical circuit. When the CD gage is installed at critical locations on a test part or structure and used as a sensing element in a control system, the signal can serve to alter a test sequence or to alert an operator to incipient component failure.

CONSTRUCTION

Two gage constructions are currently available:

The **CD-02** is made of beryllium copper alloy laminated to polyimide, and offers a low-resistance sensing element. Select the CD-02 type for maximum conformability to irregular surfaces and ease of soldering, when greatest fatigue life is not required.

The **CD-23** type is constructed of isoelastic alloy laminated to a glass-fiber-reinforced backing for applications where the highest endurance is required. The superior fatigue life of the isoelastic alloy allows the CD-23 to be used in high cyclic strain fields without premature failure, while maintaining high sensitivity to crack formation under the gage. This gage is less conformable than the CD-02 and requires use of SS-Flux for tinning of solder tabs for leadwire attachment.

Crack Detection Gages are available with various strand lengths; from 0.4 in (10 mm) for applications where space is limited, to 2.0 in (50 mm) for use where the direction of crack propagation, or the point of crack initiation, is uncertain.

Resistance of the CD Series is nominally 0.05 Ω/mm of active strand length for beryllium copper and 1 Ω/mm for isoelastic gages.

The normal operating temperature range is -320° to $+250^{\circ}$ F (-195° to $+120^{\circ}$ C).

ADHESIVES

Conventional strain gage adhesives are suitable for bonding CD-Series gages. M-Bond 600, 610, or 43-B are preferred for excellent performance over the widest operating temperature range. However, M-Bond AE-10 and AE-15 are also suitable where in-service temperatures will not exceed $+200^{\circ}F$ ($+95^{\circ}C$). M-Bond 200 is satisfactory for fast installation, but should not be used for long-term testing.

PROTECTIVE COATINGS

Corrosion, which can cause premature filament failure, is greatly accelerated in the presence of high cyclic strain fields. For long-term use, it is essential to protect the crack detection gage from atmospheric corrosion and other contamination.

M-Bond 43-B is an excellent protective coating when the bonding adhesive, leadwire insulation and solder can tolerate the cure temperature. If lower cure temperatures are necessary, M-Bond AE-10 and AE-15 are recommended. When in-service environmental conditions are not extreme, a softer coating may prove perfectly adequate. Either 3140 RTV or M-Coat D would be a good choice in these instances.

For repetitive use on identical structural shapes, special patterns may be designed to fit the expected crack formation area. Contact our Applications Engineering Department for details.



Crack Detection Patterns

Vishay Micro-Measurements

Special Purpose Sensors - Crack Detection Patterns

CD-SERIES GAGE DESIGNATION SYSTEM





			DIMENSIONS	6							
GAGE DESIGNATION				MAT	RIX						
	а	b	с	Length	Width						
CD-02-10A	0.40	0.56	0.10	0.60	0.13						
CD-23-10A	10.2	14.2	2.5	15.2	3.2						
CD-02-15A	0.60	0.76	0.10	0.80	0.13						
CD-23-15A	15.2	19.3	2.5	20.3	3.2						
CD-02-20A	0.80	0.96	0.10	1.00	0.13						
CD-23-20A	20.3	24.4	2.5	25.4	3.2						
CD-02-25A	1.00	1.16	0.10	1.20	0.13						
CD-23-25A	25.4	29.5	2.5	30.5	3.2						
CD-02-50A	2.00	2.16	0.10	2.22	0.13						
CD-23-50A	50.8	54.9	2.5	56.4	3.2						



Special Purpose Sensors - Crack Propagation Patterns

Crack Propagation Gages provide a convenient method for indicating rate of crack propagation in a test part or structure. The CPA, CPB, and CPC patterns consist of a number of resistor strands connected in parallel. When bonded to a structure, progression of a surface crack through the gage pattern causes successive open-circuiting of the strands, resulting in an increase in total resistance. The CPA pattern incorporates 20 resistor strands; the CPB, with the same basic configuration, incorporates ten. Both series produce stepped increases in resistance with successive opencircuiting as indicated in the charts below. In applications where space permits, the CPC pattern may be preferred because of greater uniformity of increases in total resistance with successive strand fractures.

The resistor strands of the CPD pattern operate independently, each producing an open circuit when fractured. This type of gage allows the user to electrically predetermine a specific point in the fracturing process at which the instrumentation will perform some type of altering function.

GAGE CHARACTERISTICS

Crack Propagation Gages have a nominal gage thickness of only 0.0017 in (0.043 mm). The high-endurance K-alloy foil grid has a single cycle strain range of up to $\pm 1.5\%$ with a fatigue life of greater than 10^7 cycles at ± 2000 microstrain.

The standard backing is a glass-fiber-reinforced epoxy matrix. These gages are useful through the temperature range of $-452^{\circ}F$ ($-269^{\circ}C$) to over $+450^{\circ}F$ ($+230^{\circ}C$).

Since exact self-temperature compensation is unnecessary in crack propagation studies, all of these gages are supplied in 09 S-T-C.

Crack Propagation Gages feature small copper pads on the tabs for ease of soldering.

ADHESIVES AND PROTECTIVE COATINGS

Crack Propagation Gages should be installed with a solventthinned adhesive incorporating a cure temperature of at least +300°F (+150°C). M-Bond 600 or 610 adhesives are recommended for use over the widest temperature range. Handling tape should not be applied over the grid or soldering tabs during installation. Room-temperature-curing adhesives are not recommended for use with Crack Propagation Gages.

Protective coating selection considerations are similar to those for CD-Series Crack Detection Gages. Refer to appropriate datasheet for protective coating recommendations.





Crack Propagation Patterns

Vishay Micro-Measurements

Special Purpose Sensors - Crack Propagation Patterns



	NOMINAL			DIMENSIONS	;								
GAGE PATTERN	RESISTANCE				MAT	RIX							
AND DESIGNATION			h		Longth	Width							
Actual size shown	UHWIS	a	D	C	Length	width							
TK-09-CPB02-005/DP	5	0.25	0.50	0.10	0.56	0.16							
		6.4	12.7	2.5	14.2	4.1							
		Ten Grid Lines -	Ten Grid Lines — 0.010 in (0.25 mm) between centerlines.										
TK-09-CPA01-005/DP	5	0.50	1.00	0.20	1.08	0.28							
		12.7	25.4	5.1	27.4	7.1							
		Twenty Grid Lin	Ten Grid Lines — 0.010 in (0.25 mm) between centerlines. 0.50 1.00 0.20 1.08 0.28 12.7 25.4 5.1 27.4 7.1 Fwenty Grid Lines — 0.010 in (0.25 mm) between centerlines. 1.00 2.00 0.40 2.08 0.48 25.4 50.8 10.2 52.8 12.2 Fwenty Grid Lines — 0.020 in (0.51 mm) between centerlines. 0.70 0.75 1.57 0.80 1.62 17.8 19.1 39.9 20.3 41.1										
TK-09-CPA02-005/DP	5	5 1.00 2.00 0.40											
		25.4	50.8	10.2	52.8	12.2							
		Twenty Grid Lin	es — 0.020 in (().51 mm) betwo	een centerline	Length Width 0.56 0.16 14.2 4.1 enterlines. 1.08 1.08 0.28 27.4 7.1 en centerlines. 2.08 2.08 0.48 52.8 12.2 en centerlines. 0.80 0.80 1.62 20.3 41.1 en centerlines. 1.11 28.1 28.1 n centerlines. 1.11							
TK-09-CPC03-003/DP	3	0.70	0.75	1.57	0.80	1.62							
		17.8	19.1	39.9	20.3	41.1							
		Twenty Grid Lir	nes — 0.080 in (2.03 mm) betw	een centerline	Width 0.16 4.1 0.28 7.1 nes. 12.2 les. 1.62 41.1 nes. 1.62 41.1 nes. 1.62 95.							
TK-09-CPD01-NRA/DP	110	0.75	1.00	1.00	1.11	1.11							
		19.1	25.4	25.4	28.1	28.1							
		Twenty Grid Line	19.1 25.4 25.4 28.1 28 Twenty Grid Lines — 0.050 in (1.27 mm) between centerlines.										

CPA, CPB, AND CPC PATTERNS

CIRCUITRY

An ohmmeter with milliohm sensitivity is a suitable readout instrument. Alternately, a strip chart recorder, connected in the manner shown at right, can be used to obtain a step curve of strands broken versus time.

CPD Pattern

Low voltage instrumentation can be employed to shut off a motor, sound an alarm, or trigger some other type of alerting function.



Conventional strain gage instrumentation is not readily adaptable for use with Crack Propagation Gages.



Special Purpose Sensors - Temperature

Resistance thermometry is a widely employed method of measuring temperature, and is based on using a material whose resistivity changes as a function of temperature. Resistance Temperature Detectors (RTD's) have fast response time, provide absolute temperature measurement (since no reference junctions are involved), and are very accurate. Their measurement circuits are relatively simple, and the sensors, when properly installed, are very stable over years of use.

Vishay Micro-Measurements resistance temperature sensors are constructed much like wide-temperature-range strain gages. The standard sensors utilize nickel or nickel/ manganin grids, although special-purpose gages are also available in Balco[®] alloy or copper foil grids. These temperature sensors are bonded to structures using standard strain gage installation techniques, and can measure surface temperatures from -452° to approximately +500°F (-269° to +260°C). Because of their extremely low thermal mass and the large bonded area, the sensors follow temperature changes in the structural mounting surface with negligible time lag.

Balco is a trademark of the W.B. Driver Company

TG TEMPERATURE SENSORS

TG Temperature Sensors are normally selected for measurements from -320° to $+500^{\circ}$ F (-195° to $+260^{\circ}$ C). The sensing grid utilizes a high purity nickel. Three basic constructions are offered:

ETG Sensors have a polyimide carrier for flexibility. It is available as an encapsulated gage with exposed solder tabs (Option E), or with integral printed-circuit terminals (Option W).

The **WTG Sensor** incorporates integral leadwires and a high-temperature epoxy-phenolic matrix (reinforced with glass fiber) which fully encapsulates the grid.

The **WWT-TG Sensor** is a slightly larger version of the WTG, but preattached to a 0.005-in (0.13-mm) thick stainless steel shim. This gage can be welded or bonded to a structure.

The resistance at +75°F (+23.9°C) is 50 Ω ±0.3% for the ETG and WTG Sensors; and 50 Ω ±0.4% for the WWT-TG Sensors.

Maximum operating temperature for ETG Sensors with Option E is +450°F (+230°C), and +350°F (+175°C) for Option W. All other types are +500°F (+260°C).

GAGE PATTERN				DIMENSIONS inches millimeters						
AND	DESIGN	ATION		GAGE	OVERALL	GRID	OVERALL	MATRIX		
Approximate Size Shown			LENGTH	LENGTH	WIDTH	WIDTH	Length	Width		
ETG-50A/Option E			and the second second	0.060	0.148	0.100	0.100	0.28	0.20	
ETG-50B/Option E	200			1.52	3.76	2.54	2.54	7.0	4.8	
				0.125	0.235	0.125	0.125	0.33	0.19	
	50A/E	50B/E	Opt W Feature	3.18	5.97	3.18	3.18	8.3	4.7	
WTG-50A WTG-50A/Option W		100	-	0.060	0.148	0.100	0.100	0.28	0.20	
WTG-50B WTG-50B/Option W				1.52	3.76	2.54	2.54	7.0	4.8	
	T			0.125	0.235	0.125	0.125	0.33	0.19	
	50A	50B	Feature	3.18	5.97	3.18	3.18	8.3	4.7	
WWT-TG-W200B-050 For weldable temperature sensor, see appropriate datasheet			0.20	(shim length) 0.71	0.200	(shim width) 0.43	0.52	0.26		
		e sensor, et	5.08	18.03	5.08	10.92	13.1	6.6		

TEMPERATURE SENSOR SELECTION

In addition to the standard line of temperature sensors described above, Vishay Micro-Measurements can furnish almost any type of sensor pattern desired, in a wide range of resistances. Contact our Applications Engineering Department for details.



Special Purpose Sensors - Temperature



Typical data for 50 Ω nickel sensor.

LOW TEMPERATURE RANGE								
NETWORK OUTPUT TEMPERATURE								
DESIGNATION	RANGE							
LST-10F-350C	10 microstrain/°F	–320° to +100°F						
LST-10C-350C	10 microstrain/°C	–200° to +25°C						
LST-100F-350C	100 microstrain/°F	–320° to +100°F						
LST-100C-350C	100 microstrain/°C	–200° to +25°C						

TG LST MATCHING NETWORKS

The temperature coefficient of resistance of nickel sensors is very high but nonlinear as indicated in the graph. The sensor resistance can be measured directly and converted to temperature with the charts supplied in Tech Note TN-506, but since TG Sensors are commonly used along with strain gages, special matching networks have been developed to use with strain gage instrumentation.

These LST Matching Networks are small passive devices encapsulated in a molded epoxy case. They are connected between TG Temperature Sensors and the strain gage readout instrumentation to perform the following three functions:

- 1. Linearize the gage resistance versus temperature.
- 2. Attenuate the resistance change slope to the equivalent of 10 or 100 microstrain per degree F or C for a gage factor setting of 2.000 on the strain indicator.
- Present a balanced 350-ohm half-bridge circuit to the strain indicator at the reference temperature of 0°F (Fahrenheit networks) or 0°C (Celsius networks).



In order to optimize performance, separate network designs are available for cryogenic and normal temperature ranges. Environmental temperature range of LST networks is -65° to $+250^{\circ}F$ (-55° to $+125^{\circ}C$). Standard strain gage instrumentation, such as the Vishay Micro-Measurements Model P-3500, is ideal for use with these sensors, eliminating the need to purchase separate readout devices.

NORMAL TEMPERATURE RANGE							
NETWORK OUTPUT SENSOR							
DESIGNATION	DESIGNATION SLOPE						
LST-10F-350D	10 microstrain/°F	–200° to +500°F					
LST-10C-350D	10 microstrain/°C	-150° to +260°C					
LST-100F-350D	100 microstrain/°F	–200° to +500°F					
LST-100C-350D	100 microstrain/°C	-150° to +260°C					

Temperature Sensors and LST Networks

Vishay Micro-Measurements



Special Purpose Sensors - Temperature

CLTS-2B TEMPERATURE SENSORS

The Cryogenic Linear Temperature Sensor (CLTS) is recommended for best accuracy over the temperature range of -452° to $+100^{\circ}$ F (-269° to $+40^{\circ}$ C). The CLTS-2B is a small surface thermometer gage consisting of two thin foil sensing grids laminated into a glass-fiber-reinforced epoxy-phenolic matrix, and electrically wired in series. The two alloys are special grades of nickel and manganin that are processed for equal and opposite nonlinearities in resistance versus temperature characteristics. The CLTS-2B is fabricated with integral printed-circuit terminals to provide strong, convenient attachment points for the leadwires. Gage construction is illustrated at right.

Because of its low thermal mass and thin construction, the CLTS-2B responds quickly and accurately to temperature changes in the surface to which it is bonded. Special design features protect the sensor from damage due to thermal shock, even during plunges from room temperature directly into liquefied gases, including LHe at $-452^{\circ}F$ ($-269^{\circ}C$).

Avoid prolonged exposure of the CLTS-2B to temperatures above +150°F (+65°C) as this may adversely affect characteristics of the manganin material. The maximum recommended curing temperature of the bonding adhesive is two hours at +200°F (+95°C).

CLTS-2B SENSITIVITY

The nominal resistance of the CLTS-2B is 290.0 ohms $\pm 0.5\%$ at +75°F (+23.9°C). The resistance decreases linearly with temperature, reaching a nominal value of 220.0 ohms at -452°F (-269°C). This represents a change of 70 ohms for 527°F, or a slope of 0.1328 ohms per degree F; the



corresponding slope on the Celsius scale is 0.2391 ohms per degree C. With proper instrumentation a resolution of 0.01° can be easily achieved. Data readout can be accomplished by directly monitoring resistance change with an appropriate resistance measuring instrument.

	DIMENSIONS							
GAGE PATTERN AND DESIGNATION	GAGE	OVERALI	GBID	OVERALL	MATRIX			
Actual size shown.	LENGTH	LENGTH	WIDTH	WIDTH	Length	Width		
CLTS-2B	0.130	0.205	0.280	0.280	0.43	0.31		
	3.30	5.21	7.11	7.11	10.9	7.9		

CLTS MATCHING NETWORKS



When used in conjunction with bonded strain gages, it is often most convenient to modify the CLTS output with a simple, passive resistance network that can be used with strain gage instrumentation as described with the TG Sensors. The sensitivity can be adjusted to 10 microstrain per degree F (CLTS-N-F) or C (CLTS-N-C); with a resolution of 0.1° when used with most strain indicators. This type of network also provides a high degree of leadwire compensation. Environmental temperature limits for CLTS Networks are -65° to $+250^{\circ}$ F (-55° to $+125^{\circ}$ C).



Special Purpose Sensors - Diaphragm Patterns

Strain gages are frequently used in pressure transducers incorporating a circular diaphragm as the spring element. The full-bridge patterns shown on this page were designed specifically to take maximum advantage of the strain distribution on a rigidly clamped diaphragm of uniform thickness, and represent an abbreviated selection of gages available for this application.

The actual design and development process for building pressure transducers "in-house" requires careful study before arriving at the best compromise between sensitivity, linearity, and frequency response. Vishay Micro-Measurements Tech Note TN-510, Design Considerations for Diaphragm Pressure Transducers, outlines some of these design considerations. For more information, contact our Transducer Applications Department.

Most pressure measurement applications can be handled with commercially available transducers. These gages are, however, an excellent choice when (1) there is no commercially available product, or (2) the application requires modification of an existing component to sense pressure.

GAGE P	ATTERN		DIMENSIONS					
AND DES Actual sized Insert desired S-T-C	IGNATION ze shown : No, in spaces marked XX ¹	RES. IN OHMS		CIRCULAR TRIM DIAMETER ²	MINIMUM DIAPHRAGM DIAMETER ³	MATRIX SIZE (SOLIABE)		
						(OGOAIIE)		
	EA-XX-182JC-120	120 ±1.0%	0.182	0.200	0.210	0.26		
	EA-XX-182JB-350	350 ±1.0%	4.62	5.08	5.33	6.6		
	SA-XX-182JC-120 SA-XX-182JB-350	120 ±2.0% 350 ±2.0%						
	EA-XX-228JC-120	120 ±1.0%	0.228	0.250	0.260	0.30		
	EA-XX-228JB-350	350 ±1.0%	5.79	6.35	6.60	7.6		
	SA-XX-228JC-120	120 ±2.0%						
	SA-XX-228JB-350	350 ±2.0%						
	SK-XX-228JC-350	350 ±2.0%						
	EA-XX-364JC-120	120 ±0.5%	0.364	0.400	0.410	0.46		
	EA-XX-364JB-350	350 ±0.5%	9.25	10.16	10.41	11.7		
	SA-XX-364JC-120	120 ±1.0%						
	SA-XX-364JB-350	350 ±1.0%						
	SK-XX-364JC-350	350 ±1.0%						
	EA-XX-455JC-120	120 ±0.5%	0.455	0.500	0.510	0.56		
	EA-XX-455JB-350	350 ±0.5%	11.56	12.70	12.95	14.2		
	EA-XX-455JB-10C	1000 ±0.5%						
	SA-XX-455JC-120	120 ±1.0%						
	SA-XX-455JB-350	350 ±1.0%						
	SA-XX-455JB-10C	1000 ±1.0%						
	SK-XX-455JC-350	350 ±1.0%						
	EA-XX-500JD-120	120 ±0.15%	0.500		0.510*	0.70		
	WA-XX-500JD-120	120 ±0.3%	12.70	—	12.95*	17.8		
	WK-XX-500JD-350	350 ±0.3%						
	SA-XX-500JD-120	120 ±0.3%	*Normally used c	on 1-in (25.4-mm)	diameter or large	er		
SK-XX-500JD-350		350 ±0.3%	diaphragms.		-			
			Circular trim, Opt	tion SP70, not ava	ailable.			

¹ Minimum Order Requirement (MOR) may apply.

² Option SP70 circular trim is available in EA Series only.

³ A minimum 0.005 in (0.13 mm) radius is recommended on a machined diaphragm section.



Special Purpose Sensors - Manganin Patterns



FOR HIGH-PRESSURE MEASUREMENTS SHOCK WAVE PROPAGATION • BLAST EFFECT • EXPLOSIVE-FORMING STUDIES HIGH HYDROSTATIC PRESSURES

Manganin is a copper-manganese-nickel alloy with a low strain sensitivity, but a relatively high sensitivity to hydrostatic pressure. Resistance change as a function of applied pressure is linear to extremely high pressures. This characteristic has been utilized in the construction of highrange fluid pressure cells using manganin wire for many years.

Manganin gages are used extensively in high-pressure shock wave studies ranging from 1 to over 400 kilobars (1 bar = 14.5 psi = 100 000 N/m²). In conventional applications, the gage is bonded between two flat metallic or polymer plates.

Vishay Micro-Measurements offers a large selection of gages for shock wave studies, manufactured from specially treated shunt stock manganin foil. The ultrathin construction offers several advantages over the wire type, including:

- Improved repeatability from gage to gage, due to precisely defined grids manufactured from the same lot of foil.
- Faster response times (nanosecond rise times have been recorded).
- Smaller, high resistance grids.
- Minimal distortion of the pressure wave when mounted in high-modulus materials.

TECHNICAL INFORMATION

Nominal pressure sensitivity of Vishay Micro-Measurements manganin foil gages is 0.27% per kilobar (0.0027 ohm/ohm/ kb). Long signal transmission cables, low signal levels, and high electrical noise complicate the measurement. Most of these gages are designed for impedance matching to 50-ohm coaxial cable. The 210AW pattern illustrated has been used with excitation currents exceeding 6 amperes for periods to 100 microseconds.

The 580SF pattern was designed specifically for investigating the effects of sweeping explosive waves. With the target intentionally tilted at a small angle to the wave front, the pressure wave traverses the grid in the direction toward the leads.

Vishay Micro-Measurements manufactures manganin foil gages in several backing materials. The backing material is normally selected to minimize the mechanical impedance mismatch within the target.

L backing is a glass-fiber-reinforced epoxy-phenolic approximately 0.002 in (0.050 mm) thick. Although commonly used in the 1- to 15-kilobar range, its usefulness is not limited to this extent. The backing is ideal for use in quartz-phenolic transducers since it does not present a significant impedance discontinuity. L-backed gages may be used in high-mechanical-impedance materials with the understanding that rise-time limitations may exist due to an impedance mismatch between the sensor and the test material. An encapsulated version (Option SP60), with only the tab ends exposed for soldering, is available.

N2 backing is nominally 0.0008 in (0.020 mm) thick polyimide film. This backing is rugged, highly flexible, and easy to handle. It is suited to very-low-kilobar pressure ranges.

J2 backing is an encapsulated version of the N2, with the ends of the tabs exposed.



Special Purpose Sensors - Manganin Patterns



MANGANIN GAGE SELECTION CHART

GAGE	MINIMUM	DIMENSIONS						
DESIGNATION [†]	ORDER	FOU	OVERALL PATTERN		ACTIVE	TAD		
	(PKGS)	THICKNESS	Length	Width	Length	Width	LENGTH	
LM-SS-110FB-048 LM-SS-110FB-048/SP60	5	0.0002	1.380	0.125	0.110	0.125	1.240	
N2M-SS-110FB-048 J2M-SS-110FB-048	5	0.005	35.05	3.18	2.79	3.18	31.49	
LM-SS-125CH-048 LM-SS-125CH-048/SP60 N2M-SS-125CH-048 J2M-SS-125CH-048	5 5	0.0002	0.290	0.175	0.125	0.175	0.100	
	5 5	0.005	7.37	4.45	3.18	4.45	2.54	
LM-SS-210AW-048 LM-SS-210AW-048/SP60	1	0.0005	1.750	0.250	0.210	0.250	1.500	
N2M-SS-210AW-048 J2M-SS-210AW-048	1 3	0.013	44.45	6.35	5.33	6.35	38.10	
LM-SS-210FD-050 LM-SS-210FD-050/SP60	5 5	0.0005	2.500	0.250	0.210	0.250	2.250	
N2M-SS-210FD-050 J2M-SS-210FD-050	5 5	0.013	63.50	6.35	5.33	6.35	57.15	
LM-SS-580SF-025 LM-SS-580SF-025/SP60	2	0.0004	2.018	0.600	0.580	0.008	2.000	
N2M-SS-580SF-025 J2M-SS-580SF-025	2 2	0.010	51.26	15.24	14.73	0.20	50.80	

†All resistance values are \pm 1%, measured on the tab near the grid.



Special Purpose Sensors - Shear Modulus Testing

Shear Modulus Sensors are specifically designed to accommodate the unique specimen geometries and strainfield distributions encountered when testing composite materials for shear properties. Two popular specimens for in-plane shear modulus testing of composites are the losipescu and compact designs. The test section for both types is described as the area between two opposing notches. The losipescu specimen has a distance between the notch roots of 0.45 in (11.4 mm); for the compact design this distance is 0.75 in (19 mm). Both of these specimens have an inherently nonuniform shear-strain distribution in their test zone. Determining shear modulus requires extracting an average shear-strain value from this nonuniform strain field. Since strain gages have the unique characteristic of integrating the surface strain field under their grids, average specimen strain is automatically obtained by spanning the entire length of either specimen's test section.

Two 500 Ω ±0.4%, ±45° shear-gage configurations are available for both the losipescu and compact specimen designs.

The planar configuration, with side-by-side grids, is constructed with a standard N2 backing and Option SP61 (beryllium-copper lead ribbons and polyimide film encapsulation). The stacked configuration is produced with a special backing, A2. This backing is similar to N2 but is fully encapsulated with a polyimide film and includes integral berylliumcopper lead ribbons (like those provided by Option SP61). The stacked configuration is offered to best simulate strain measurement at a point. The stacked gages are supplied in a guarter-bridge arrangement so that independent gage measurements can be made if necessary. When connected in a half-bridge circuit, the stacked construction inherently provides temperature compensation and insensitivity to normal strains. Due to the increased stiffness of a stacked sensor, compared to one having only a single layer, an evaluation of the test conditions and requirements should be made to ensure that the gage will not compromise accuracy by significantly reinforcing low-modulus and/or thin specimens.

				DIMENSIONS								
GAGE AND DE	PATTERN	GAGE	OVERALI	GBID	OVERALL	MAT	RIX					
Insert Desired S-T-C N	No. in Spaces Marked XX.	LENGTH	LENGTH	WIDTH	WIDTH	Length	Width					
	N2A-XX-C032A-500/SP61	0.032	0.462	0.031	0.197	0.500	0.257					
	N2P-08-C032A-500/SP61	0.81 each section	11.73	0.79 each section	5.00	12.7	6.5					
		For use with lo	osipescu specim	ens.								
	N2A-XX-C032B-500/SP61	0.032	0.762	0.031	0.197	0.800	0.257					
	N2P-08-C032B-500/SP61	0.81 each section	19.35	0.79 each section	5.00	20.3	6.5					
		For use with c	ompact specime	ns.								
	A2A-XX-C085C-500	0.085	0.445	0.070	0.200	0.500	0.260					
	A2P-08-C085C-500	2.16 each section	11.30	1.78	5.08	12.7	6.6					
		For use with lo										
	A2A-XX-C085D-500	0.085	0.745	0.070	0.200	0.805	0.260					
	A2P-08-C085D-500	2.16 each section	18.92	1.78	5.08	20.4	6.6					
3X		For use with c	ompact specime	ns.								





Special Purpose Sensors - Embedment Gages



The EGP-Series Embedment Strain Gage is specially designed for measuring mechanical strains inside concrete structures. The sensing grid, constructed of a nickel-chromium alloy (similar to Karma), has an active gage length of 4 in (100 mm) for averaging strains in aggregate materials. A rugged 5-in (130-mm) outer body of proprietary polymer concrete resists mechanical damage during pouring, minimizes reinforcement of the structure, and provides protection from moisture and corrosive attack. The grid, cast within the polymer concrete to ensure maximum strain sensitivity, is self-temperature-compensated to minimize thermal output when installed in concrete structures. Each gage incorporates a heavy-duty 10-ft (3-m) cable with 22-AWG (0.643-mm dia.) leadwires; a three-wire construction to the sensing grid helps minimize temperature effects in the instrumentation leads. Special lengths of preattached cable will be quoted upon request. Vishay Micro-Measurements M-LINE accessory cable 322-DJV is available for adding cable length in the field.

Rugged and reliable, EGP-Series Strain Gages are available in both 120-ohm (EGP-5-120) and 350-ohm (EGP-5-350) resistances.

SPECIFICATIONS

- Construction. Strain sensing grid cast in a sturdy, water-resistant material.
- Sensing Grid. Nickel-chromium alloy on polyimide backing. Active gage length of 4 in (100 mm) nominal. Grid resistance of 120 or 350 ohms, ±0.8%.
- Outer Body. Proprietary polymer concrete. 5 x 0.7 x 0.4 in (130 x 17 x 10 mm) nominal.
- **Cable.** Three 10-ft (3-m) leads of 22-AWG (0.643-mm dia.) stranded tinned copper in 0.015-in (0.4-mm) thick PVC insulation. Nominal cable diameter of 0.2 in (5 mm). (Other lengths quoted upon request.)
- Temperature Range. The normal usage range is +25° to +125°F (-5° to +50°C). Extended range is -25° to +150°F (-30° to +60°C).

EMBEDMENT GAGE SELECTION

		DIMENSIONS					
GAGE DESIGNATION	RES. IN OHMS	ACTIVE GAGE LENGTH	OUTER BODY WIDTH	OUTER BODY LENGTH	OUTER BODY THICKNESS		
EGP-5-120	120 ±0.8%	4	0.7	5	0.4		
		100	17	130	10		
EGP-5-350	350 ±0.8%	4	0.7	5	0.4		
		100	17	130	10		
Vishay Micro-Measurements



FATIGUE LIFE FOR EA-SERIES GAGES

Technical Data

GAGE SERIES

All Vishay Micro-Measurements strain gages incorporate precision foil grids mounted on organic backing materials. The strain-sensing alloys and backing materials cannot be arbitrarily combined in specifying a gage type. Instead, a selection must be made from among the available gage systems, or series, where each series generally incorporates special design or construction features, as well as a specific combination of alloy and backing material.

Descriptions of all standard gage series are given on the following pages, along with performance specifications and application notes. The information includes, in each case, the alloy and backing combination employed, as well as the principal construction features common to the series. The allowable strain range is specified, and operating temperature ranges are recommended for different types of applications.

The plots of cyclic strain level versus number of cycles shown for each series represent general guidelines for the nominal fatigue characteristics. This data is a function of gage size with the upper curve indicative of larger gage patterns, and the lower curve of smaller gage patterns. Since the fatigue life of a strain gage is subject to special interpretation, reference should be made to Vishay MicroMeasurements Tech Note TN-508, Fatigue Characteristics of Vishay Micro-Measurements Strain Gages, for a full understanding of the plotted data.

The fatigue curves on the following pages correspond to fully reversed strain levels. They can also be applied, approximately, to unidirectional strains and to combinations of mean and variable strains by derating the peak-to-peak amplitude by 10%. As an example, a fully reversed strain range of $\pm 1500\mu\epsilon$ is approximately equivalent in gage fatigue damage to strain levels of:

0 to +2700µ∈

0 to -2700µ∈

-200 to +2500µ∈

However, a mean strain which increases in the tensile direction during cycling will lead to much earlier failure.

It must be noted that all performance specifications for strain gages are nominal, since the behavior of a particular gage may be modified by installation or application circumstances. Moreover, the specifications apply primarily to gages of 0.125 in (3 mm) gage length and larger, and without optional features, unless otherwise indicated.

± 3000

± 2600

± 1800

± 1400

lΝμ∈

법 표 2200

CYCLIC STRAIN

EA Series

EA-Series constantan gages are widely used in general-purpose experimental stress analysis applications. The basic gage is of open-faced construction on a 0.001 in (0.025 mm) tough, flexible cast polyimide backing. The strength and heat resistance of this backing provide excellent handling and performance qualities. This series is available in the widest range of patterns and will usually be the lowest in cost for a particular pattern design. A large number of options may be obtained for EA-Series gages, covering various forms of lead attachment and protective encapsulation. The backing is treated for strong bond formation with all standard strain gage adhesives. Strain limits are approximately $\pm 5\%$ for gages of 1/8 in (3 mm) or greater gage length and $\pm 3\%$ for smaller sizes.





Technical Data

Vishay Micro-Measurements

CEA Series

CEA-Series gages are the most widely accepted for use in general-purpose experimental stress analysis applications in the world today. These polyimide encapsulated constantan gages feature large, rugged, copper-coated tabs. This construction provides optimum capability for attaching leadwires directly to the tabs, eliminating the need for separate terminals. In most applications, the CEA Series is preferred over the EA Series with options such as E, L, LE and W. Nominal single-plane gage thickness is 0.0027 in (0.069 mm); stacked rosettes, 0.0039 in (0.099 mm). The extremely tough but flexible cast polyimide carrier can be contoured to almost any radius. Strain limits are approximately $\pm 5\%$ (50 000µ \in) for gage lengths 1/8 in (3 mm) or greater, and $\pm 3\%$ for smaller sizes.





N2A Series

N2A-Series gages are open-faced constantan on a special, thin, laminated polyimide backing. The backing is very flexible and tough. Backing thickness is approximately 0.0008 in (0.020 mm), and the backing has been specially treated for optimum bond formation. The N2A Series has an elongation capability of approximately ±3%. These gages are intended for use in elastic strain fields. This series is primarily available for certain large gage patterns because its flatness eases handling.



± 3000



are varving.

The thermal output of constantan

become difficult if temperatures <

increases rapidly below -50°F (-45°C). Static measurements

Gage Series - Stress Analysis Gages

Vishay Micro-Measurements

Technical Data



WA-Series gages are fully encapsulated constantan, equipped with integral, highendurance beryllium copper leadwires. The backing and encapsulation matrix consists of a high-temperature epoxy-phenolic resin system reinforced with glass fibers. Overall gage thickness is approximately 0.0028 in (0.071 mm). The WA construction provides a gage that is strong and easy to handle, though not as flexible as the EA type. The backing is treated for strong bond formation with all standard strain gage adhesives. The strain range is limited to approximately ±1 to 2% by the hard, creep-resistant matrix. WA-Series gages are primarily intended for high accuracy measurements over wider temperature ranges and in more difficult environments than other forms of constantan gages. Option W is available on some WA-Series gages, but will restrict the fatigue life to some extent. Heat-curing adhesives such as M-Bond 600 or 610 are recommended when full-temperature-range capabilities are required.



± 3000

+ 2600

± 1800

SMALL GAGE

Ę

LEVEI ± 2200

OPERATING TEMPERATURES FOR WA-SERIES GAGES



SA Series

SA-Series gages are fully encapsulated constantan similar to WA-Series gages, but with solder dots instead of leadwires. The matrix is somewhat thinner than the WA type, with an overall gage thickness of approximately 0.002 in (0.05 mm). The solder is a lead-tinsilver alloy which melts at approximately +570°F (+300°C). These gages are typically silver alloy which melts at approximately +570 r (+300 0). These gages are specially used in stress analysis applications when mounting space is restricted. The solder dot connections permit small jumper wires to be attached from any direction, and the matrix and the pattern since no integral leadwires are involved. can be field-trimmed very close to the pattern since no integral leadwires are involved. Because of the exposed solder dots, SA-Series gages are not as well protected in extreme environments as the WA type. The WA Series is superior in maximum temperature capability and fatigue life. No leadwire options are available in this series. Strain limits are approximately ±1 to 2%. Heat-curing adhesives such as M-Bond 600 or 610 are recommended for full-range performance.



FATIGUE LIFE FOR SA-SERIES GAGES

LARGE GAGES



± 6000

± 5000

+ 4000

± 3000

Vishay Micro-Measurements

Technical Data

EP Series

EP-Series gages are specifically designed for use in the measurement of large strains, >3-5%. The basic gage is of open-faced construction on a 0.001 in (0.025 mm) tough, flexible, high-elongation cast polyimide backing. The sensing grid is a special grade of fully annealed constantan foil for maximum ductility. This gage series is available in 08 and 40 compensations, for use on metals and plastic, respectively. Exact values of selftemperature compensation are usually not important in post-yield work because the thermal output error is very small compared to the large strain levels being measured. Strain limits for EP-Series gages are approximately $\pm 20\%$ for gages of 1/8 in (3 mm) or greater gage length, and ±10% for smaller sizes. Optional features generally degrade elongation capabilities. EP-Series gages can be obtained on special order with all options offered on the equivalent EA-Series pattern. M-Bond A-12 adhesive is recommended for full elongation capability.





ED Series

ED-Series gages are used in general-purpose dynamic-only strain measurement. They are open-faced construction on a thin, 0.001 in (0.025 mm), tough, flexible cast polyimide backing. The isoelastic grid alloy has a high strain sensitivity, and gage factor is approximately 3.2. The extremely high temperature coefficient of resistance [thermal output of approximately $80\mu \in /{^{\circ}F}$ ($145\mu \in /{^{\circ}C}$)] does not normally permit static measurements to be made with isoelastic gages. The outstanding features of the ED Series are excellent handling properties, high flexibility, good fatigue life, and relatively low cost. A wide range of options is available, covering various forms of lead attachment and protective encapsulation. Leadwires must be handled and installed with care to avoid reduction in fatigue life. All isoelastic gages tend to generate error signals in magnetic fields, since the alloy is both magnetic and magnetostrictive. Strain limits for ED gages are approximately ±1%, but increasing nonlinearity above ±5000µ∈ normally restricts this type of gage to measurement of dynamic, elastic strain levels.



FATIGUE LIFE FOR

LARGE GAGES

Gage Series - Stress Analysis Gages

Vishay Micro-Measurements

Technical Data



± 6000 **WD Series** FATIGUE LIFE FOR WD-SERIES GAGE WD-Series gages are fully encapsulated isoelastic alloy with integral, high-endurance ± 5000 beryllium copper leadwires. The matrix is a high-temperature epoxy-phenolic resin system reinforced with glass fibers. Overall gage thickness is approximately 0.0028 in (0.071 mm). LEVELI ARGE GAGES These gages are excellent in dynamic strain measurement over wide temperature ranges. ± 4000 The WD Series is considerably less flexible than the ED type, but is useful over a wider temperature range and in more severe environments. The encapsulation matrix and + 3000 integral high-endurance leadwires provide higher fatigue life than ED-Series gages. No standard options are available. Strain limits for WD-Series gages are approximately SMALL GAGES + 2000 ±5000µ∈. Heat-curing adhesives such as M-Bond 600 or 610 will provide best overall performance. ± 1000 10 102 10³ 10⁴ 10⁵ 10⁶ 10⁷ 10⁸ NUMBER OF CVC **OPERATING TEMPERATURES FOR WD-SERIES GAGES** Isoelastic gages become increasingly nonlinear at high strain levels as temperatures increase, due to decrease in the elastic limit of the alloy. SPECIAL OR EXTENDED DYNAMIC RANGE Backing life is reduced as FULL DYNAMIC RANGE temperature increases **BEST DYNAMIC RANGE TEMPERATURE IN °C** Solder Melts at + 770°F (+ 410°C) +200 +100+150-400 300 200 -100 +100+200+300 +400+500+600 +700 **TEMPERATURE IN °F**

± 6000

± 5000 Nμ∈

± 4000

 ± 2000

SMALL GAGES

LEVEL

CYCLIC STRAIN ± 3000

SD Series

SD-Series gages are fully encapsulated isoelastic alloy similar to WD-Series gages, but with solder dots instead of leadwires. The matrix is somewhat thinner than the WD type, with an overall thickness of approximately 0.002 in (0.05 mm). The solder is a lead-tin-silver alloy which melts at +570°F (+300°C). The SD Series is primarily used over the WD type when the matrix must be trimmed very close to the gage pattern because of restricted mounting space. There are no integral leadwires to restrict trimming of the lower edge of the matrix, and attachment wires can be routed to the solder dot tabs from any direction. Both maximum operating temperature and fatigue life are somewhat lower than in the WD Series because of the exposed solder dots. Strain limits are approximately ±1%, but nonlinearity becomes increasingly severe above $\pm 5000 \mu \in$. Heat-curing adhesives such as M-Bond 600 or 610 will provide best overall performance.



FATIGUE LIFE FOR SD-SERIES GAGES



± 6000

± 5000

± 4000

± 3000

+ 2000

± 6000

± 5000

± 4000

± 3000

+ 2000

+1000

SMALL GAGES

LEVEL IN μ∈

CYCLIC STRAIN

SMALL

CYCLIC STRAIN LEVEL IN

Vishay Micro-Measurements

FATIGUE LIFE FOR EK-SERIES GAGES

ABGE GAGES

FATIGUE LIFE FOR WK-SERIES GAGES

ARGE GAGES

Technical Data

EK Series

EK-Series gages are K alloy, often employed in general-purpose testing where higher resistances and grid stability are required, particularly at elevated temperatures. They are normally selected for applications where reinforced laminate-backed gages lack sufficient flexibility. EK gages are of open-faced construction on a 0.001 in (0.025 mm) tough, flexible cast polyimide backing. The strong, heat-resistant backing provides excellent handling and performance qualities, and is treated for good bond formation with all standard strain gage adhesives. Heat-curing adhesives such as M-Bond 610 are recommended for full-temperature-range capabilities. Strain limits for this series are approximately ±1.5%. EK gages are often selected instead of EA gages for improved fatigue life. However, when maximum fatigue life is required, reinforced laminate-backed K-alloy gages are included as a standard feature. Most options available on EA-Series gages are offered with EK gages, but performance may be degraded.



WK Series

WK-Series gages are fully encapsulated K alloy, equipped with integral, high-endurance beryllium copper leadwires. The matrix is a high-temperature epoxy-phenolic resin system reinforced with glass fibers. Overall gage thickness is approximately 0.0028 in (0.071 mm). WK-Series gages have the widest temperature range and most extensive environmental capability of any general purpose strain gage of the self-temperature-compensated type. Option W is available on many pattern designs, but will lower the excellent cyclic endurance and maximum operating temperature of the basic WK gage. Elevated temperature drift of these gages is very low to +600 °F (+315°C), and the main restriction at high temperatures is the limited life of the backing and adhesive due to oxidation and sublimation. Strain limits for WK gages are approximately $\pm 1.5\%$. High temperature adhesives such as M-Bond 610 are required for full-range performance.



Gage Series - Stress Analysis Gages

Vishay Micro-Measurements

Technical Data





S2K Series

Gage factor drops more rapidly

below - 300°F (- 185°C).

S2K-Series gages are fully encapsulated K alloy, equipped with large integral solder pads. The backing and encapsulation are 0.001 in (0.025 mm) thick laminated high-performance polyimide. The overlay fully encapsulates the grid and solder tabs. Large [0.030 in (0.75 mm)] diameter solder pads are provided for ease of leadwire attachment. Overall gage thickness is approximately 0.0025 in (0.065 mm) and the backing has been specially treated for optimum bond formation. M-Bond 43-B is recommended for S2K-Series gages if a cure temperature of +350°F (+175°C) is possible. Alternatively, M-Bond AE-10/15, M-Bond 200, or M-Bond 600/610 may be used. The S2K Series has an elongation capability exceeding ±1.5%. Designed primarily for use on composites, these gages are normally produced in larger patterns and higher resistances.



± 3000

TEMPERATURE IN °F





Vishay Micro-Measurements

Technical Data

OPTIONAL FEATURES

Vishay Micro-Measurements offers a wide selection of optional features for its general-purpose strain gages and special-purpose sensors. The addition of options to the basic gage construction usually increases the cost, but this is generally offset by the benefits. Examples are:

- · Significant reduction of installation time and costs.
- Reduction of the skill level necessary to make dependable installations.
- · Increased reliability of applications.

- Simplified installation of sensors in difficult locations on components or in the field.
- Increased protection, both in handling during installation and shielding from the test environment.
- · Achievement of special performance characteristics.

Availability of each option varies with gage series and pattern. Standard options are noted for each sensor in the product listing.

Shown below is a summary of the optional features offered. Detailed descriptions will be found on the following pages.

STANDARD OPTIONS

The optional features shown below are considered standard when they are listed with the gage series and pattern in the General-Purpose Strain Gage Listings.

OPTION	BRIEF DESCRIPTION	AVAILABLE ON GAGE SERIES	
W	Integral Terminals and Encapsulation	As shown in General-Purpose Strain Gage Listings	
E	Encapsulation with Exposed Tabs		
SE	Solder Dots and Encapsulation		
L	Preattached Leads		
LE	Preattached Leads and Encapsulation		
Р	Preattached Leadwire Cables and Encapsulation		
P2	Preattached Leadwire Cables for CEA-Series Gages		
R	Individually Furnished Resistance Value		
S	Solder Dots	Special order required	
W3	Special Terminals		

If the option desired is not shown in the Strain Gage Listings, it may be available as a special order. Please contact our Applications Engineering Department for specific information.

SPECIAL OPTIONS

The following applies to Special Options:

- 1. Availability will depend on the specific gage series and pattern.
- 2. A quotation is required and can be requested from our Customer Service Department.
- 3. A minimum order quantity may be required.
- 4. Whenever more than one Special Option is required, a custom part number will be assigned to the gage/option combination.

OPTION	BRIEF DESCRIPTION	AVAILABLE ON GAGE SERIES
SP11-14	Single Batch of Foil per Order	All
SP21-24	'Modulus-Compensating' Foil	EK, WK, SK, S2K
SP30	Round Ni-Clad Copper Leads	EA, WA, ED, WD, EK, WK, EP
SP60	Special Encapsulation	Only on Manganin Gages
SP61	Preattached Leads and Encapsulation	N2A, N2P
SP70	Circular Trim for Diaphragm Gages	EA
SP81	Special Customer-Specified Information Added to Engineering Data Sheet	All

Vishay Micro-Measurements

Technical Data

OPTION W SERIES AVAILABILITY: EA, EP, WA, ED, WD, EK, WK

General Description: This option provides encapsulation, and thin, printed circuit terminals at the tab end of the gage. Beryllium copper jumpers connect the terminals to the gage tabs. The terminals are 0.0014 in (0.036 mm)] thick copper on polyimide backing nominally 0.0015 in (0.038 mm) thick. Option W gages are rugged and well protected, and permit the direct attachment of larger leadwires than would be possible with open-faced gages. This option is primarily used on EA-Series gages for generalpurpose applications. Solder: +430°F (+220°C) tin-silver alloy solder joints on E-backed gages, +570°F (+300°C) lead-tin-silver alloy solder joints on W-backed gages. Temperature Limit: +350°F (+175°C) for E-backed gages, +450°F (+230°C) for W-backed gages. Grid Protection: Entire grid and part of terminals are encapsulated with polyimide. Fatigue Life: Some loss in fatigue life unless strain levels at the terminal location are below ±1000µe. Size: Option W extends from the soldering tab end of the gages and thereby increases gage size. With some patterns, width is slightly greater. Strain Range: With some gage series, notably E-backed gages, strain range will be reduced. This effect is greatest with EP gages, and Option W should be avoided with them if possible. Flexibility: Option W adds encapsulation, making gages slightly thicker and stiffer. Conformance to curved surfaces will be somewhat reduced. In the terminal area itself, stiffness is markedly increased. Resistance Tolerance: On E-backed gages, resistance tolerance is normally doubled.

OPTION E SERIES AVAILABILITY: EA, ED, EK, EP

General Description: Option E consists of a protective encapsulation of polyimide film approximately 0.001 in (0.025 mm) thick. This provides ruggedness and excellent grid protection, with little sacrifice in flexibility. Soldering is greatly simplified since the solder is prevented from tinning any more of the gage tab than is deliberately exposed for lead attachment. Option E protects the grid from fingerprints and other contaminating agents during installation and, therefore, contributes significantly to long-term gage stability. Heavier leads may be attached directly to the gage tabs for simple static load tests. Supplementary protective coatings should still be applied after lead attachment in most cases. **Temperature Limit:** No degradation. **Grid Protection:** Entire grid and part of tabs are encapsulated. **Fatigue Life:** When gages are properly wired with small jumpers, maximum endurance is easily obtained. **Size:** Gage size is not affected. **Strain Range:** Strain range of gages will be reduced because the additional reinforcement of the polyimide encapsulation can cause bond failure before the gage reaches its full strain capability. **Flexibility:** Option E gages are almost as conformable on curved surfaces as open-faced gages, since no internal leads or solder are present at the time of installation. **Resistance Tolerance:** Resistance tolerance is normally doubled when Option E is selected.

OPTION SE

SERIES AVAILABILITY: EA, ED, EK, EP

General Description: Option SE is the combination of solder dots on the gage tabs with a 0.001-in (0.025 mm) polyimide encapsulation layer that covers the entire gage. The encapsulation is removed over the solder dots providing access for lead attachment. These gages are very flexible, and well protected from handling damage during installation. Option SE is primarily intended for small gages that must be installed in restricted areas, since leadwires can be routed to the exposed solder dots from any direction. The option does not increase overall gage dimensions, so the matrix may be field-trimmed very close to the actual pattern size. Option SE is sometimes useful on miniature transducers of medium- or low-accuracy class, or in stress analysis work on miniature parts. Solder: +570°F (+300°C) lead-tin-silver alloy. To prevent loss of long-term stability, gages with Option SE must be soldered with noncorrosive (rosin) flux, and all flux residue should be carefully removed with M-LINE Rosin Solvent after wiring. Protective coatings should then be used. Temperature Limit: No degradation. Grid Protection: Entire gage is encapsulated. Fatigue Life: When gages are properly wired with small jumpers, maximum endurance is easily obtained. Size: Gage size is not affected. Strain Range: Strain range of gages will be reduced because the additional reinforcement of the polyimide encapsulation can cause bond failure before the gage reaches its full strain capability. Flexibility: Option SE gages are almost as conformable on curved surfaces as open-faced gages. Resistance Tolerance: Resistance tolerance is normally doubled when Option SE is selected.













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OPTION L SERIES AVAILABILITY: EA, ED, EK, EP

General Description: Option L is the addition of soft copper lead ribbons to open-faced polyimidebacked gages. The use of this type of ribbon results in a thinner and more conformable gage than would be the case with round wires of equivalent cross section. At the same time, the ribbon is so designed that it forms almost as readily in any desired direction. Leads: Nominal ribbon size for most gages is 0.012 wide x 0.004 in thick (0.30 x 0.10 mm). Leads are approximately 0.8 in (20 mm) long. Solder: +430°F (+220°C) tin-silver alloy. Temperature Limit: +400°F (+200°C). Fatigue Life: Fatigue life will normally be degraded by Option L. This occurs primarily because the copper ribbon has limited cyclic endurance. When it is possible to carefully dress the leads so that they are not bonded in a high strain field, the performance limitation will not apply. Option L is not often recommended for very high endurance gages such as the ED Series. Size: Matrix size is unchanged. Strain Range: Strain range will usually be reduced by the addition of Option L. Flexibility: Gages with Option L are not as conformable as standard gages. Resistance Tolerance: Not affected.



OPTION LE SERIES AVAILABILITY: EA, ED, EK, EP

General Description: This option provides the same conformable soft copper lead ribbons as used in Option L, but with the addition of a 0.001-in (0.025-mm) thick encapsulation layer of polyimide film. The encapsulation layer provides excellent protection for the gage during handling and installation. It also contributes greatly to environmental protection, though supplementary coatings are still recommended for field use. Gages with Option LE will normally show better long-term stability than open-faced gages which are "waterproofed" only after installation. A good part of the reason for this is that the encapsulation layer prevents contamination of the grid surface from fingerprints or other agents during handling and installation. The presence of such contaminants will cause some loss in gage stability, even though the gage is subsequently coated with protective compounds. Leads: Nominal ribbon size for most gages is 0.012 wide x 0.004 in thick (0.30 x 0.10 mm) copper ribbons. Leads are approximately 0.8 in (20 mm) long. Solder: +430°F (+220°C) tin-silver alloy. Temperature Limit: +400°F (+200°C). Grid Protection: Entire gage is encapsulated. A short extension of the backing is left uncovered at the leadwire end to prevent contact between the leadwires and the specimen surface. Fatigue Life: Fatigue life will normally be degraded by Option LE. This occurs primarily because the copper ribbon has limited cyclic endurance. Option LE is not often recommended for very high endurance gages such as the ED Series. Size: Matrix size is unchanged. Strain Range: Strain range will usually be reduced by the addition of Option LE. Flexibility: Gages with Option LE are not as conformable as standard gages. Resistance Tolerance: Resistance tolerance is normally doubled by the addition of Option LE.



LEADWIRE ORIENTATION FOR OPTIONS L AND LE

These illustrations show the standard orientation of leadwires relative to the gage pattern geometry for Options L and LE. The general rule is that the leads are parallel to the longest dimension of the pattern. The illustrations also apply to leadwire orientation for WA-, WK- and WD-Series gages, when the pattern shown is available in one of these series.



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OPTION P SERIES AVAILABILITY: EA, N2A

General Description: Option P is the addition of preattached leadwire cables to many patterns of EA-Series strain gages. Encapsulation seals small "jumper" leadwires at gage end, and cable insulation protects solder joints at cable end. Option P virtually eliminates need for soldering during gage installation. Leads: A pair of 1-in (25-mm) M-LINE 134-AWP (solid copper, polyurethane enamel) single conductor "jumper" leadwires. Cable: 10 ft (3.1 m) of color-coded, flat, three-conductor 26gauge (0.404 mm dia.), stranded, tinned copper with vinyl insulation (similar to M-LINE 326-DFV). Solder: +430°F (+220°C) tin-silver alloy solder joints, "jumper" to gage. Cable conductors and "jumpers" joined with +361°F solder beneath cable insulation. Exposed leadwires on unattached end of cable are pretinned for ease of hookup. Temperature Limit: -60° to +180°F (-50° to +80°C); limited by vinyl insulation on cable. Grid Encapsulation: Entire grid and tabs are encapsulated. Fatigue Life: Fatigue life will normally be degraded by Option P, primarily because the copper "jumper" wires have limited cyclic endurance. Pattern Availability: Most EA-Series single-grid patterns that are 0.062 in (1.5 mm) or greater gage length, with parallel solder tabs on one end of the grid, and suitable for encapsulation. (Consult our Applications Engineering Department for availability of Option P on other gage series/patterns, and for nonstandard cable lengths.) Size: Matrix size is unchanged. Strain Range: Strain range will usually be reduced by the addition of Option P. Flexibility: E-backed gages with Option P are not as conformable as standard gages. Resistance Considerations: Each conductor of the cable has a nominal resistance of 0.04 ohm/ft (0.13 ohm/m). Gage resistance is measured at gage tabs. Gage Factor: Gage factor is determined for gages without preattached cable. Resistance Tolerance: Resistance tolerance is normally ±0.5% for single-element gages, and ±0.6% for multiple-grid gages.

OPTION P2 SERIES AVAILABILITY: CEA

General Description: Option P2 is the addition of preattached leadwire cables to CEA-Series strain gages. Option P2 virtually eliminates need for soldering during gage installation. **Cable:** 10 ft (3.1 m) of color-coded, flat, three-conductor 30-gauge (0.255 mm), stranded, tinned copper with vinyl insulation (similar to M-LINE 330-DFV). **Solder:** +361°F (+180°C) tin-lead alloy solder joints. Exposed leadwires on unattached end of cable are pretinned for ease of hookup. **Temperature Limit:** -60° to +180°F (-50° to +80°C); limited by vinyl insulation on cable. **Grid Encapsulation:** Entire grid is encapsulated. (Solder tabs are not encapsulated.) **Fatigue Life:** Fatigue life will normally be unchanged by Option P2. **Pattern Availability:** Most CEA-Series single- and multiple-grid patterns. **Size:** Matrix size is unchanged. **Strain Range:** Standard for CEA-Series gages. **Flexibility:** No appreciable increase in stiffness. **Resistance Considerations:** Each conductor of the cable has a nominal resistance of 0.1 ohm/ft (0.35 ohm/m). Gage resistance is measured at gage tabs. **Gage Factor:** Gage factor is determined for gages without preattached cable. **Resistance Tolerance:** Not affected.



OPTION S SERIES AVAILABILITY: EA, ED, EP, N2A

Precisely formed hemispherical solder dots are installed in the center of each solder tab. This feature facilitates soldering by providing a pretinned area for lead attachment. A film of adhesive or appropriate protective coating is normally applied over the gage before soldering, and this prevents the solder from spreading on the tab when leads are reinstalled. After the top coating has been cured, the solder dot is easily exposed for soldering by scraping with a scalpel or by simply post-tinning. Solder used for the dots is $+570^{\circ}F$ ($+300^{\circ}C$) lead-tin-silver alloy. Dot diameter varies somewhat with tab size but is usually about 0.02 in (0.5 mm). Temperature limit for this feature is $+500^{\circ}F$ ($+260^{\circ}C$). Because the solder dots result in much greater soldering uniformity, the variable fatigue life factor, which results from excessive solder on the gage tabs, is eliminated. Solder dots are small and interfere very little with flexibility and conformability of strain gages.

OPTION W3 SERIES AVAILABILITY: EA, EP, WA, ED, EK, WK

This feature is identical to Standard Catalog Option W, except that the printed circuit wiring terminals have three solder pads, two of which are electrically common. These terminals facilitate the connection of three-conductor cable for single active gage circuits using the three-wire lead system. Many of the gage patterns which are marked as available with Option W in the General-Purpose Strain Gage Listings are available with three-pad terminals.





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OPTION R SERIES AVAILABILITY: ALL

The resistance of each gage is separately measured with an accurate digital ohmmeter and the exact value is recorded on the transparent folder that contains the gage. Resistance is given to the nearest 0.01 ohm, and the overall absolute accuracy is $\pm 0.05\%$ or better for gages of 60-ohm or greater resistance; thus allowing the user to select gages very closely matched in resistance from the total group of gages purchased. The necessary order quantity can be estimated for any matching requirements by assuming an even distribution of resistance values through the tolerance band, which is unchanged. Note: This feature is less effective for open-faced gages without leadwires or solder dots because of the uncertainty in leadwire position on the tabs with user-installed leadwires.

SPECIAL OPTIONS

OPTION SP11, 12, 13, 14:	SERIES AVAILABILITY: ALL			
These options specify that all sensors are supplied from a single process batch and lot of foil. They are primarily used to obtain the closest possible matching of performance characteristics from a large group of gages.				
SP11: One sensor type	e from a single batch of processed foil			
SP12: Two sensor type	es from a single batch of processed foil			
SP13: Three sensor types from a single batch of processed foil				
SP14: Four sensor typ	es from a single batch of processed foil			

OPTION SP21, 22, 23, 24: SERIES AVAILABILITY: EK, WK, SK, S2K

This option series provides strain gages with 'Modulus Compensation' features through use of specially modified lots of K alloy. The 'Mod-Comp' match will be quite close for the materials specified, although thermal output characteristics may not be ideal.

When force-responsive type transducers are manufactured from the metals listed, and the appropriate Special Option gages are used, the result is a transducer which demonstrates very little span change with temperature.

NOMINAL GAGE FACTOR SLOPE

%/100°F	%/100°C	FOR USE ON
-1.50	-2.70	Stainless Steels
-2.35	-4.25	Aluminum Alloys
-1.25	-2.25	Tool Steels
-1.35	-2.45	Tool Steels
	%/ 100°F 1.50 2.35 1.25 1.35	%/100°F %/100°C -1.50 -2.70 -2.35 -4.25 -1.25 -2.25 -1.35 -2.45

OPTION SP30 SERIES AVAILABILITY: EA, WA, ED, WD, EK, WK, EP

General Description: This option consists of special leadwires, either added to open-faced gages, or substituted for lead ribbons on WA-, WK-, or WD-Series gages. The wire is very formable, and may be spot-welded or soldered to main leadwires. The primary advantages are easy handling and excellent resistance to oxidation at the highest temperatures the gages can withstand. Leads: 0.8 in (20 mm) long nickel-clad copper wires 0.005 in (0.13 mm) diameter. For some gage types, usually small patterns, wire size must be reduced to 0.0035 in (0.09 mm) diameter. Solder: EA-, ED-, EK-, EP-Series gages: +430°F (+220°C) tin-silver alloy; WA-Series gages: +570°F (+300°C) lead-tin-silver alloy; WK- and WD-Series gages: +770°F (+410°C) solder. Temperature Limit: E-backed gages: +400°F (+200°C); WA-Series gages: +500°F (+260°C); WK- and WD-Series gages: +750°F (+400°C). Fatigue Life: Fatigue life will normally be degraded by Option SP30. This occurs primarily because the copper wire has limited cyclic endurance. Option SP30 should therefore not be used when best fatigue life is required, unless the tab area of the gage is in a low strain area (±1000µe or less). Loss of cyclic endurance is experienced particularly with WA-, WK-, and WD-Series gages. Size: Matrix size is unchanged. On W-backed gages, SP30 leads are substituted for the normal beryllium copper ribbon leads. One wire lead per tab is supplied. Strain Range: Option SP30 normally reduces the strain range of E-backed gages but does not similarly affect W-backed gages. Flexibility: E-backed gages with SP30 leads are not as conformable as standard gages. W-backed gages are not affected. Resistance Tolerance: Not affected.

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OPTION SP60 SERIES AVAILABILITY: ONLY ON MANGANIN GAGES

SP60 is an encapsulation option available for L-backed manganin gages. The end of each tab includes a thin copper coating that is left exposed for lead attachment.

OPTION SP61 SERIES AVAILABILITY: N2A, N2P

General Description: This option provides conformable, soft copper lead ribbons and a 0.0005-in (0.013-mm) thick encapsulation layer of polyimide film. The encapsulation layer provides excellent protection for the gage during handling and installation. It also contributes greatly to environmental protection, though supplementary coatings are still recommended for field use. Gages with Option SP61 will normally show better long-term stability than open-faced gages which are "waterproofed" only after installation. A good part of the reason for this is that the encapsulation layer prevents contamination of the grid surface from fingerprints or other agents during handling and installation. The presence of such contaminants will cause some loss in gage stability, even though the gage is subsequently coated with protective compounds. **Leads:** 0.010 wide x 0.002 in thick (0.25 x 0.05 mm) soft copper ribbons. Leads are approximately 0.8 in (20 mm) long. **Solder:** +430°F (+20°C) tin-silver alloy. The solder is confined to small, well-defined areas at the end of each ribbon. **Temperature Limit:** +400°F (+200°C). **Grid Protection:** Entire gage is encapsulated. A short extension of the backing is left uncovered at the leadwire end to prevent contact between the leadwires and the specimen surface. **Size:** Matrix size is unchanged. **Strain Range:** Strain range will usually be reduced by the addition of Option SP61. **Flexibility:** Gages with Option SP61 are not as conformable as standard gages. **Resistance Tolerance:** Resistance tolerance is normally doubled by the addition of Option SP61.

OPTION SP70: SERIES AVAILABILITY: EA

This is a special trim option for certain diaphragm gages. This type of gage is normally packaged with a square matrix, and is field-trimmed by the customer, if necessary, to fit the diaphragm. A circular gage trim is only required, in most cases, when the diaphragm hub is on the gaged side of the diaphragm. When Option SP70 is selected, the matrix is trimmed to the nominal trim diameter specified in the appropriate gage listing.

OPTION SP81: SERIES AVAILABILITY: ALL

When special packaging identification is required, Option SP81 must be specified. A maximum of three (3) lines of up to fourteen (14) characters each may be included in the format shown to the right. When specifying SP81, the purchase order must show the information to be printed.





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